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For the Southern Agriculturist.

OBSERVATIONS ON THE MODE OF RENOVATING SOILS.

Mr. Editor:—In the preceding articles, which I had the honour of addressing you, I spoke of the origin and formation of Soils, and gave some details of modes by the practice of which the actual constituents could be ascertained, and from such knowledge the remedies deduced. I now propose to make a few observations upon the practicable means of renovating that which has been deteriorated.

When to a congenial climate is united a well constituted soil, with sufficient inclination for drainage, we have the most precious of natural gifts. The maintenance of the fertility of such land is a duty for which no praise is due, and deterioration a positive disgrace, arising either from incapacity, the want of a proper sense of duty, or an overweening passion for gain. Soil is capital, and its resources diminished as its fertility is exhausted, but the ratio of decrease in the value of land, though dependent on, is not in direct proportion to the decrease of yield, or interest: on examination it will be found to exceed it. The great desideratum, in agriculture, is to cultivate without depreciating the value of the land, but to increase productiveness, or in other words so to use the capital that it may return the greatest interest, without diminution, an end rarely if ever accomplished in this country.

Renovation is eminently a work of labour, I know of no short cut to that end, there is however a choice of routes. When the soil has been washed away, and the underlying strata laid bare, the question of reclamation becomes one of formation. The manner of cultivating, and the improper adaptation of crops to the surface of the ground, without a proper attention to the mineralogical composition of the soil, are among the prominent causes which have produced this result. Declivities have been worked as level lands, without considering their precarious nature or position, or their liability to ruin under such treatment.

The effects of gravitation become more marked as substances approach fluidity, and as it is a property of aluminous substances to form a paste with water, it follows that if you mellow the earth to but a slight depth on aluminous hill sides, it is more liable to be carried away than if the depth loosened had been greater, and this tendency will of course be in proportion to the quantity of water,

degree of declivity, and shallowness of ploughing. Hence the necessity for discrimination in the kind of cultivation under which we place lands having different inclinations, which becomes the more necessary as substances are of easy disintegration, and decomposition, have a small specific gravity, and the slopes more precipitate. There are positions that, however carefully they may be cultivated with the plough, cannot be prevented from washing, without an undue proportion of expense, and should therefore be appropriated to such uses as to yield a profit and sustain themselves without incurring the necessity of plough culture.

It is not necessary to dwell upon the methods in use for equalising accidental irregularities, they are daily practised; simple, and to a certain extent efficient. The object is effected by strewing the base, or washed, surface with brush, straw, manure, or in fine such organic rubbish as may be convenient, and by throwing such obstacles in the channels of escape, as common sense would dictate, whereby the rapidity of descent is arrested, and depositions increased. Logs placed longitudinally across the wash, brush, briars and branches with stems against the descent are familiar examples. Bare spots are thus enabled to produce, and the removal of earth diminished as vegetation becomes more luxuriant. This end having been accomplished, the next consideration which arrises is the best permanent appropriation to which they can be applied. I have an abiding confidence in the importance of grasses to all agricultural communities, and independent of their utility for supporting stocks, and the well known fertilizing properties acceded to certain varieties, I know of nothing more cheering in a landscape than a luxuriant sward. On the score of humanity they may be considered essential, and the return more than equivalent to sustain and improve the present generally degenerate stock that are seen wandering about in search of nutriment, which when found is ungrateful.

I shall not enter into a discussion of the different varieties which may, or not be peculiarly adapted to this climate, or the different soils that are found in this country. Suffice it to say, that I have seen the red clover growing and thriving, equally as well as could be expected from similar lands in more northern latitudes. But there is one perennial species known here, and not so well north, of which I think highly as being a great acquisition to any country, and particularly suited to this region—it is kindred to the joint grass, and known in Georgia and the lower part of this State, by the name of Barbuda, and appears originally to have been introduced into this Continent from the East, where it is highly prized, to the extent of having been called "God's grass." Its fibrous roots extend far and wide into the earth, which gives it a power of absorbing nourishment, and thriving luxuriantly, where other vegetation almost refuses to grow. It increases by joints, which it gives

off in every direction, and extends itself to an indefinite distance. The surface of the ground becomes covered, and closely matted, like a fine net work, and thus it is enable and fitted to sustain a precipitate talus of earth, which without, it would run away, and is I understand, extensively used in the low country, for sustaining embankments, to which use it is found admirably adapted. Its appearance is light and beautiful, and it increases under the closest grazing, and though I have never seen hay made from it, I know of no cause which would lead me to question its fitness for that purpose. An objection is urged against it, which is, that it is eradicated with difficulty. In a porous soil, or under exclusive hoe culture, this objection might obtain, but as far as my experience extends, I should apprehend no difficulty on that score in this climate. I have found it easily destroyed by shade, or when buried to a slight depth beneath the surface, and do not consider it more formidable than blue grass, which is easily managed with turning ploughs. As a covering for lawns it appears well adapted, and if kept down by sheep could scarce have a superior. It is propagated by planting, which at first would appear a long and tedious operation, but it is easily effected by checkering with a coulter, and dropping portions of the plant in the furrow. I am acquainted with a field or stable lot, that was treated after this manner, and though horses &c., have had free access to it from the day it was planted it has increased and nearly covered the surface.

But there are a multiplicity of applications, and the only difficulty or embarrassment exists in the choice. I shall proceed and give a few hints and examples, of what I have seen and heard practised elsewhere, as selection must depend upon a variety of circumstances.

There are timbers which in all countries are considered valuable, and which in ours must become more so as forests disappear. The locust is one of this description, and has the advantage of rapid growth. The wood of the chestnut and oak are not only prized, but when planted far enough apart, they become annual and abundant bearers; to these might be added others, and among the number the persimmon. The latter I am informed is cultivated extensively in China, where attention has increased the size and quality of its fruit, and made it mature without seed. These fruits would not be a trifling auxiliary for the support of the present half starved miserable looking porkers, ranging at large over the country, and what proprietor would not find his advantage in an orchard of different fruits, arriving at maturity in succession, for the consumption of his family as well as stock. An intelligent Virginian told me that his hogs (enough for the supply of sixty or seventy in family,) were fatted on the refuse of his apple orchard.

The marronier is a variety of chestnut—grows to a large size, and is much cultivated in Europe. The fruit is larger than the

chestnut, and a favourite article of food. During the winter season it is cooked in a variety of ways, and forms a common dish as well upon the table of the rich as the poor, and the most delicate Italian Macaroni is fabricated from its farina. The English Walnut is another favourite. Its wood is much admired and extensively used for the manufacture of furniture, gun-stocks, &c. The tree is highly ornamental and adds much to the beauty of the parts of Europe where it is planted along the roads and other spots, which would otherwise lie waste. The kernel of this fruit is large, in proportion to the shell, from which it is easily separated, and an oil expressed therefrom, which when fresh, is thought by many to rival that yielded by the olive. This nut and its products, afford considerable profit to proprietors.

The culture of the prune plum is an extensive and lucrative business in parts of France, whence it is exported to all parts of the world. The bitter and sweet almonds, are other instances which might be attended to with advantage. Independent of the soft shell as a fruit, an oil is extracted from all the varieties, greatly esteemed for multifarious uses.

The North of Italy, which has been so long and so justly celebrated for its agriculture, offers an example of the useful with the ornamental, well worthy of imitation. The mulberry is here planted at equal distances, and the vine festooned from tree to tree. This combination of the grape and mulberry together, with the rearing of worms, and fabrication of silk, might bring the uncultivatible hill sides into profitable report, and make them as an *auxiliary*, as great a source of profit, if not greater, than more level lands, and this application would appear particularly suited to this country, where lands are cheap, well adapted to the purpose, and where according to our present economy of labour, there is so much time lost for the want of suitable and regular employment for the old and young, the weak and infirm, whose labour might be turned advantageously to account by this opposite occupation. But I would not wish it to be understood that I countenance any such absurdity as the multicaulis speculation, which I have always considered as one of the to be expected humbug offspring of the worn out parent, unrestricted banking.

The modes hinted for the employment of hill sides, do not preclude the use of some of the cultivated grasses. Among these, lucerne stands pre-eminent, and therefore a short description of its properties will not be considered out of place at this time. This grass, though not strictly a perennial, has a duration of from ten to twelve years, and in this respect, takes precedence over clover, to which it is nearly allied, as also for the abundance and quality of its produce. Whether it would thrive under partial shade I am unable to state, but feel satisfied that I hazard nothing in saying, that it could be replaced by few if any other grass crop. Columella esti-

mated this plant as the choicest of all fodder, "because it lasted so long, and bore being cut five or six times a year. It enriches the land upon which it grows, fattens the cattle fed with it, and one fourth of an acre he thinks abundantly sufficient to feed one horse the whole year." It is greatly esteemed in Persia and some parts of South America, where, according to Loudon, it is mown every month in the year, and is of unknown antiquity in Spain, South of France, and Italy. The climate best adapted to it, is one that is warm and dry. I know a piece of ground situated in Abbeville district, which was planted some three years since, it stood the extraordinary drouth of 1839, and was cut for the sixth time last year, on the first of August. A second piece was planted last spring, and was knee high in August and in bloom. To insure its success, the soil should be rich, (and can scarce be made too much so,) deep and well pulverized. It requires a yearly top dressing of manure, and ashes among others, appear well adapted to it. It is thought by many to be superior to clover, for increasing the quality and quantity of milk and butter, and its produce is stated to be as high as eight tons to the acre, if well attended. By cultivating this extraordinary plant upon hill-sides, it would prevent washing, and this would be more effectual if planted in rows, a foot apart, each row having no more inclination than necessary to drain the water. —Thus drilled, it could be worked from time to time, until its growth would shade the ground, and itself aid in subduing other intruding plants. To this might be added the well known gama grass, which has attracted so much attention of late years, throughout this and adjoining States.

Whatever may be the eventual decision upon the use of hill-sides, I feel convinced that, in many instances, a restoration to the forest would be preferable to their present unprofitable, and unsightly state, which does not limit the extent of injury; as the more prolific surrounding low grounds are not unfrequently ruined by the avalanches of sand which periodically visit and inundate them.

By pulverization and organic matter, fertility is maintained, and productiveness insured. These two cardinal objects are attained by efficient ploughing, and manuring. As they are skillfully executed, so will the desired vegetation be luxuriant, and where the greatest skill and economy are united, the greater will be the profits. "What" says Cato, "is the best culture of land? Good Ploughing! What is the second? Ploughing! What the third? Laying on manure!" Among many directions which he gives, he says the Farmer in his walks should push his stick into the ground frequently to see that no balks or hard soil is left. Nor does he leave any doubt as to the depth of soil, for he states, "that land should be of good quality for two feet in depth."

It appears that the delicate annual roots of plants alone have the power of introsusception. Pulverization, then, is essential, that they

may penetrate and multiply in all directions, as rapidly as possible, and the greater the facility presented them for this enlargement, provided there be a presence of food, the greater will be the strength and early maturity of the plant. An unerring sign of poor land is the disproportionate size of the roots, and a consequent bulging out of the stock of the tree near the ground.

The earth when minutely divided, more readily absorbs moisture; and what is equally important, as readily gives off any excess.—This is the reason why a deeply pulverized soil is less liable to be effected by drought, or excess of rain. The atmosphere is composed of oxigen, azote, hydrogen, and carbon. The first and second are the most abundant—hydrogen is chiefly combined with oxygen in the form of water, and carbon combined with oxigen as carbonic acid and the oxyde of carbon. Some plants contain the four constituents, whilst most generally azote is wanting. Therefore the pulverization of the soil is not only necessary to admit the circulation of the air to the roots, but essential in producing those changes in the inert organic matter necessary to make it meet food for plants, there being no fermentation without the presence of oxigen. The gas dissolved in atmospheric humidity is found to be nearly pure oxygen, pulverization aids the absorption of dew, and this great supporter of life, (oxygen,) in a weak combination, is thus brought in contact with the delicate aliment searching organs, to the evident advantage of vegetation.

Ploughing has for further object, the commingling and distribution of the separate parts, the one with the other, bringing that which was at bottom to the surface, and the reverse, and to be efficient, should be executed with instruments that make as thorough a change as possible, of the relative position of the parts constituting a soil. Mere displacement, as is effected by those implements denominated coulters, gophers, harrows, &c., however useful in their place, does not accomplish the desired object. In working the stiff or aluminous soils in the States of Virginia, Maryland and Pennsylvania, a strong turning plough is a favourite instrument to which are attached three or four able bodied horses. To manage such a power, with such an instrument, the most capable operative is selected. Columella, in speaking of the ploughman, says,—"That a degree of genius is necessary, it is not enough—he should be tall and strong." To incorporate and commingle a rich and thin surface with the barren sub-soil, is diluting, if I may be allowed the expression, without corresponding advantages; but an addition of organic matter, minutely incorporated with the earth, thus increasing depth without extenuating those principles necessary to fertility, must be a manifest desideratum.

When the surface undulates, the direction of the furrows has an obvious influence on fertility. Horizontal furrows have their advantages as well as disadvantages, but the former far counterbalance

the latter. Among the latter will be found the inefficiency to retain the water of impetuous rains, requiring almost impracticable uniformity of direction, strength and elevation of the ridges, to prevent the water breaking over, which when commenced, is attended with disastrous consequences, and even when the desired object is attained, the land is placed, to a certain extent, in the predicament of that which requires draining. These objections are considerably obviated, if not entirely removed, by giving a gradual descent to each furrow, ending in a permanent channel of escape, formed and maintained, as essential to the successful operation of the system.

By attention to the conformation of an elevation, it will be easy to select the proper and natural escapes for the water, that would be concentrated by the furrows. When these washes or ditches have been formed sufficiently deep, they should be filled (when convenient,) with rock, about two thirds,—the spaces between the rocks will soon become filled with earth, when grass &c. will take root and grow, and thus prevent further laceration. These permanent drains form natural turning rows, and if executed with attention and skill, will prove highly satisfactory; as I am acquainted with several practical illustrations of the efficiency of this mode of culture, which is extolled without limitation by the practitioners.

The first emigration to Abbeville district took place in 1754, and to that part termed Calhoun's settlement in '56. The pioneers to this section described the soil as extremely fertile, and vegetation as luxuriant; for says one of these, "A walking stick might then with care be thrust far into the ground, and a wild turkey could be tracked a whole day, so mellow was the soil, and the pea vines, which grew thick, could be tied over a horses back." When we contrast that description with the state of things as they are now found, the difference is great; for the properties which characterize the generality of land, that has been under tillage for any length of time, are great avidity for water, and sensitiveness to drought, tenacity and disposition to bake, which requires rapid workings, and more of them, and these will not suffice, for where the lands are at all "worn" the crops show a deficiency in the modes of culture, and attention that has heretofore been bestowed upon them. In the cotton crop this is manifested by a general want of vigour in the plant, a tendency to rust, and great liability to attacks from lice &c., which would not be so apparent was the plant more vigorous and consequently better able to resist these affections and depredations, the more striking as the land is more impoverished. Give fertility to the soil and you add vigour to the plant, *et vice versa* It appears clear, that the desirable qualities described, depended upon the presence of organic matter, and the evils now so much deplored, to the absence of so necessary a portion of a fertile soil.

That calcerous soils possess a recuperative energy greater than those of a silico aluminous composition, is a truth I think well at-

tested, and that a soil impoverished by culture may be restored to pristine fertility, and even surpass it, is I think not less certain.—Though lime forms one of the constituents of all enduring fertile lands, and may be, with few exceptions, always added with benefit, impoverishment does not appear to result from its exhaustion, or that of any other of the inorganic constitutents, as the quantity taken up is minute, but rather from the exhaustion, or removal of those organic substances which are necessary to the formation and existence of vegetation, and by the vital agency of plants transformed into ligneous fibre, &c. Hence restoration depends mainly upon the addition of vegetable and animal matter—the enduring effects of the substances added, and their incorporation with the earth.—Bones are considered among the most valuable of manures, that value is not entirely dependent upon the nature of the inorganic matter of which they are partially formed, (phosphate and carbonate of lime,) nor upon the quantity of gelatine, or organic portion, but upon the endurance and gradual fermentation of the latter. The phosphate and carbonate have a spongy form or net like construction, which envelopes and preserves the gelatine, and as the former gradually decays, the latter becomes active, and thus gives by degrees to the support of plants. As an instance of the durability of gelatine contained in bones, I will cite the following facts: On a memorable occasion a party of scientific gentlemen wishing to commemorate a certain epoch, took of the bones of an extinct animal, which had been disinterred after being buried for an indefinite period. They were treated with muriatic acid, which dissolves the carbonate and phosphate of lime, leaving the gelatine intact, which was properly prepared, and formed the basis of a soup, which stood at the head of the table, at this interesting scientific jubilee.

A substance which de-composes gradually must possess more value as a manure, than one whose decomposition is rapid, and hence it is that I consider it prejudicial to add to a matter whose decomposition is slow though sufficient, a fermenting mass capable of imparting a quick chemical action. For instance, I think it bad economy to haul the scrapings of the woods to litter the barn yard, and then after manipulation, to haul them again to the spot where they are finally required, because the action thus engendered decreases the mass and lessens its durability, and by rendering soluble that which was insoluble, destroys one great advantage derived from its physical juxtaposition, which adds so much to friability, and this in stiff soils is desirable.

I would remark here, though it be confidently believed, and perhaps well attested, that the final maturation of graniferious plants is more exhausting to a soil than its whole previous growth, I cannot understand why the mere solidification of those substances, already withdrawn from the earth, should cause so marked a

difference as I have heard stated, in exhausting land ; be that as it may, instead of ploughing in crops imperfectly mature, which from the fact of their imperfect formation are of quick decomposition, I should, for the reasons assigned, give preference to their use when fully matured, for there cannot be exhaustion, when in addition to that which has been taken from the soil, you return that which the plant has elaborated from the surrounding atmosphere.

Impoverishment would appear to be the removal or absence, and improvement the addition or presence of active organic matter. Of this I think we have abundant manifestation in the long repeated succession of similar crops grown in gardens in the environs of large cities not only where the soil is calcareous, as is the case in the environs of Paris and London, but also near Berlin, and in our own country, Philadelphia, Washington City, &c., where there are no calcareous rocks apparent. These spots have long continued to be appropriated to the same uses, without apparent diminution of fertility, which may be attributed to the abundant and never ceasing supply of manure afforded by the proximate concentration of population.

With us, where the estates are so large, the question of renovation is indeed one of difficulty, and its combination with profit would appear at first incompatible, though to a certain extent they may be made to march *pari passu*.

The Roman allotment was about seven acres, and of this proportion Mutius uttered the memorable words, "God forbid that an estate sufficient to support a Roman and his family should be considered small." Such a system would admit of perfect amelioration by addition, but where the land estates frequently extend to thousands of acres, and that without a proportionate amount of active capital to make it available, there must be impoverishment.

This is the great and crying evil of our day, and under such a state of things man must be ruled by his estate, and is frequently a greater slave than he for whom money has been paid. As the land exhausts, an effort is made to equalize the deficiency of yield, by cultivating an increased quantity, and as the sphere of operations increase, so do the difficulties, until at last disheartened, the proprietor has to choose between concentration and emigration. The latter is most frequently resorted to. The succession is then divided, and where the whole was apparently insufficient to give surtenance to one, wealth and profusion attended those who cultivate the fractions.

When the surface of the country undulates, equal addition to the whole is unnecessary. The vales are enriched from the higher spots, and by bestowing attention to the latter there is a great saving of labour. In many countries this advantage is rea ized, and the saying "keep up the knolls, and the valleys will take care of

themselves," has become a proverb. This is accomplished differently, according to the position and necessities of the country. In the beautiful and fertile valley of the Shanendoah, in Virginia, wheat is the cash crop and the main dependance of the farmer; stock cattle are also an object of attention, and source of profit, but the number of these fed, depends upon the quantity of *ruffage** to be consumed (mainly the straw from which the wheat has been threshed,) and as this is large or small, so does the farmer purchase a greater or less number of cattle. The droves arrive from the West about the month of September, and have the range of the clover fields during the fall. After the wheat crop is cut, it is stacked near where it grew, and when it suits the convenience of the farmer it is threshed upon the spot, in the open field, from whence the wheat is hauled directly to the mill. The threshing machines are, of course, portable, and driven by horse-power. It is common for neighbors to unite and own a machine together, at other times they are let out for toll. These machines thresh from one, to two hundred bushels a day, but many are reputed to do much more. The poorest spot or spots in the field are selected for stacking and feeding the straw, and according to the number of feeding places, so many are enriched, and the surplus manure is carried to other proximate spots, requiring addition. In the spring the cattle are turned out to grass, and by the month of July are ready for the shambles, when they are sold, not uncommonly, for double what they cost the preceding fall. But if there was no other gain than that derived from the conversion of the ruffage into manure, the provident proprietor would consider himself amply rumunerated. The same care is taken in the selection of a spot for fattening hogs, for it is usual for the farmers of that region to raise and fatten not only what they require for home consumption, but for exportation.

In parts of the West the farmers main dependance is stock, for which corn is almost exclusively raised. This valuable plant when sufficiently matured for hardening the grain, (and this I am informed is the case when the lower leaves begin to turn,) is cut off close to the ground and stacked in the field. The hogs and cattle are penned together, and the grain, leaves and stock, as they were cut, are thrown in to them, and what is not consumed by the one is taken by the other. Besides this resource, impoverished fields are renovated by sowing them down in small grain, and letting the stock have access to it when beginning to mature, and after the straw is tramped to the ground, it is buried by turning ploughs. Thus the stock is kept in thriving condition during the summer, and the land benefited. Independent of the advantages derived for the support of stock, this mode of renovation is preferred by many, to clover.

* This word is not orthodox, but as it is expressive and somewhat used, with your permission I will retain it.

By sowing impoverished land in some varieties of millet, which yield abundantly in straw as well as grain, turning the stock upon it at the proper time, and burying with the plough, and succeeding this immediately by one or more crops of buckwheat, (for it arrives at maturity in six weeks,) the same season, much might be effected in the way of fertilizing, and in this state the gain would be large, if we could economize that annual tribute which is paid to the West for pork, &c. But this economy would not be the greatest profit, it would fall short of the gain that would accrue from increased fertility, which in other words means increased capital and interest.

It has been remarked by many, that wherever distilleries occupy a part of the attention of the farmer, agriculture is advanced, and in certain parts of the United States this is eminently the case, whether you look at the fertility of the land, made manifest by the abundant harvests, the quantity and quality of stock, or the solid comforts of the inhabitants, and the air of neatness that prevails over their improvements.

However much the abuse of ardent spirits may be deprecated, there is no doubting the fact, that a distillery in connection with a farm, gives profit from the product, whether it be whiskey, or alcohol, and this is from sound or damaged grain.

There is also gain from the hogs and cattle which are fattened from the waste wash, or swill, that would be otherwise lost, and which is better for this purpose than the grain itself would have been, had it been employed without preparation, and the farmer never fails to reap an abundant harvest, if fertility will insure that blessing. Burke, in his "Thoughts on Scarcity," after considering the subject of distilleries, finishes that topic by the following remarks, "I consider therefore the stopping of the distillery, economically, financially, commercially, mechanically, medicinally, and in some degree morally too, as a measure rather well meant than well considered. It is too precious a sacrifice to prejudice."

Some experiments have lately been made upon the effects of covering the ground between the cotton rows, with leaves, straw, &c. I look upon the result of these experiments as important to the South, for if the repeated and laborious cultivations now necessary, can be replaced by the addition of organic matter, even at an increased expense, the projector will deserve well of his country.

Among other products of this climate the pindar and cotton seed appear to have advantages, in favour of which much might be said. They are both eminently oleaginous. The extraction of oil from the pindar can be attended with no difficulty, and it is a source of regret that as much cannot be said of cotton seed. The pulp in this case appears to be surrounded by a shell, which when the seed is crushed entire, absorbs the oil and prevents its extraction by pressure. From notices observed in the public journals, some time

back, this difficulty was said to have been surmounted. Patents were taken out for hulling machines, and large manufactories established for the fabrication of the oil. This industry appears to have succumbed, and I have heard it alledged that this desactude was caused by the want of a sufficient supply of seed. If the modes of fabrication were ever sufficiently perfect, it would be interesting (at least to myself,) to know the cost, and whether that which was not profitable on a large scale might not be made so on a smaller, if each planter were to extract oil to the extent of his seed. Oil is a costly article. The hull would be a resource as manure, and the oil cake advantageous as food for stock, for the more stock that can be *well* kept, the greater the quantity of manure, and with this, fertility and consequently profits, are increased.

It is common for soils in the course of cultivation to show a proneness for the production of particular growths, to the exclusion or destruction of others more desirable. When the soil is said to be sick or diseased, it is not uncommon for entire crops thus to be destroyed. Unfortunately these disastrous consequences are more marked upon silico aluminous formations than others. The application of the solifiable bases are extensively used for the purpose of correcting this tendency. Lime and its carbonate are common applications from its abundance and general dissemination. The carbonates of potash and soda, of iron, and even that of the much abused magnesia, might be advantageously used, but the latter substances are less bountifully disseminated, and less attention has been paid to their application. It is also remarked, that after the addition of lime, plants of the most desirable kinds spring up, and thrive luxurianty, and this without seeding, and where they refused to grow previous to the addition of that substance. Such is found to be the case with the green grass, *(poa pratensis L.,)* and according to my friend Mr. W. Darlington, of West Chester, Penn., "all that is necessary to have the benefit of this admirable grass, is to prepare the ground for its reception," and this is attained on aluminous soils by the addition of lime, &c.

York County, Penn., contains a part of the Blue Limestone formation, another portion is argilacious, or silico aluminous, and this its inhabitants had commenced abandoning, until they discovered the efficacy of lime as a renovator. Since when the lands have increased in value.

A friend and pattern to farmers inherited a patrimonial estate of about sixteen hundred acres in Maryland, lying east of the limestone formation that traverses that State. When he took possession of it, the land was not only very impoverished, but the whole property in bad condition. When I last visited that, now interesting, locality, an hundred and twenty thousand bushels of lime had already been added; and where clover had refused to grow, it was as luxuriant as could be seen anywhere, and his crops of grain were

heavy, when before the application of lime they would scarce reproduce the seed. Besides ordinary stock cattle, there is on this farm near an hundred north Devon's (as pure blood, if not more so than any others in the United States,) several hundred sheep of improved breed, and a stock of hogs that he had so perfected by attention, they (to use his own expression,) "contained just bone sufficient to support the flesh." This gentleman writes me that his last crop, on land *not limed*, was entirely destroyed by sorrel.

I have not dwelt upon this interesting branch of the subject (liming,) as much as many may think it deserves, from its importance, but it has been so frequently and ably handled by others more capable than myself, of giving the practical results, that I consider it unnecessary. I will however embrace this opportunity of noticing two facts, respecting the discovery of lime in this upper region, one in Elbert, Georgia, the other in the district of Abbeville, in this State, which cannot otherwise than be considered valuable acquisitions. A worthy friend residing on his plantation about five miles west of Vienna, on the Savannah River, in opening a ditch, remarked a substance somewhat novel in its appearance, and did me the honor to forward me specimens for investigation. They were informal in shape, of a greyish white colour, and effervesced strongly on the application of an acid. I am unable to state the extent which this variety of carbonate of lime or marl, is there found, but its discovery in that region is important. I am also informed that a like substance has lately been found, in a similar manner, about five or six miles East of Trotter's shoals, on the Savannah, in that part of the district called Flat Woods, which from the conformation of that peculiar section I am disposed to think likely to contain such deposites.

Much might be said upon the properties and relative value of manures. However interesting such a discussion, its utility is limited, as none of those substances coming under the application of manures (I do not include those of inorganic origin,) are so valueless as to be cast aside or neglected for others whose relative value may be greater. I shall therefore postpone that consideration for the present, and merely add, that he who expects to thrive from agriculture, cannot pay too much attention to the collection of all substances of organic origin. It is important that they should be incorporated with the earth at a proper time, but under no circumstances should their addition be neglected, for he who adds the largest quantity of manure, must reap the most bountiful harvests.

In connection with this subject a judicious rotation of crops is of vast importance, and as a part, I place great reliance on the varieties of peas and beans, for field culture.

C.

ON EXPERIMENTS ON MANURES.

To the Trustees of the Essex Agricultural Society:—

Gentlemen:—The committee to whom was referred the communication of Dr. Andrew Nichols, on the subject of compost manures, have at several times visited his farm in Middleton, where he has made experiments. The soil is naturally light, and for many years has been severely cropped without receiving much manure. The number of live stock kept upon the farm is small, and but little manure has been purchased. The distance from any place where animal manure can be purchased at a reasonable rate, seems almost to preclude his means of obtaining it. Under such difficulties Dr. Nichols has been very successful in the manufacture and application of a compost, the ingredients of which are meadow mud, ashes, and a small portion of animal manure. His success has been extraordinrry, as will be evident to any one who knows the exhausted condition of the soil, and who has witnessed the heavy crops it is made to yield.

In the application of liquid manure made from meadow mud and potash, Dr. Nichols has been less successful this year than in his last year's experiment. A further trial may establish or overthrow his theory on this subject. We hope he will continue his experiment, for it is of as much consequence that farmers should know what applications are useless or hurtful, as what will produce abundant harvests.

The committee recommend that the communication of Doctor Nichols be published; they also desire him to furnish for publication, the analysis of the mud, and an essay on the subject of peat mud, muck, sand, &c., as promised in said communication, and they recommend that the Society pay Dr. Nichols for his successful experiments, and valuable communications, a gratuity of ten dollars.

For the Committee,

DANIEL P. KING.

Danvers, Dec. 1840.

ANDREW NICHOLS' STATEMENT.

To the Committee to whom was referred the communication of Andrew Nichols, on the subject of Compost Manures, &c.

GENTLEMEN:—Having invited the attention of the Trustees of the Essex Agricultural Society to our continued use of, and experiments on fresh meadow or peat mud as a manure, it is of course, expected that the result of these experiments should be laid before them. The compost with which we planted most of our corn and potatoes the present year, was composed of the same materials,

and managed in the same manner as that which we used last year for the same purpose. (See Essex Agricultural Transactions for 1839, p. 35.)

[Although Dr. Nichols' statement for '39 was inserted in this paper last year, we have thought it best to re-publish, because the subject is one of the most important to the farming interests that at present engages the attention of agriculturists. The great desideratum is, a cheap and expeditious method of rendering peat and muck food for plants. Dr. Nichols brings science, many years careful observation and a good stock of experience to bear upon the laws by which the growth of plants is carried on and increased. We saw his fields in '39, and were satisfied that he then obtained good crops, at much less than the ordinary expense for manure.—*Ed. N. E. Farmer.*]

DR. NICHOLS' STATEMENT OF 1839.

Persuaded of the importance of the discoveries made by Doctor Samuel L. Dana, of Lowell, and given to the world through the medium of the reports of Professor Hitchcock and Rev. H. Colman, to the Legislature of Massachusetts, concerning the food of vegetables, geine, and the abundance of it in peat mud, in an insoluble state to be sure, and in that state not readily absorbed and digested by the roots of cultivated vegetables, but rendered soluble and very easily digestible by such plants by potash, wood ashes, or other alkalies, among which is ammonia, one of the products of fermenting animal manures, I resolved last year to subject his theories to the test of experiment the present season. Accordingly I directed a quantity of black peat mud, procured by ditching for the purpose of draining and reclaiming an alder swamp, a part of which I had some years since brought into a state highly productive of the cultivated grasses, to be thrown in heaps. During the winter I also had collected in Salem, 282 bushels of unleached wood ashes, at the cost of 12½ cents per bushels. These were sent up to my farm, a part to be spread on my black soil grass lands, and a part to be mixed with mud for my tillage land. Two hundred bushels of these were spread on about six acres of such grass land, while it was covered with ice and frozen hard enough to be carted over without cutting it into ruts. These lands produced from one to two tons of good merchantable hay to the acre, nearly double the crop produced by the same lands last year. And one fact induces me to think, that being spread on the ice, as above mentioned, a portion of these ashes was washed away by the spring freshet. The fact from which I infer this, is, that a *run* below, over which the water coming from the meadow on which the largest part of these ashes were spread flows, produced more than double the quantity of hay, and that of a very superior quality to what had been ever known to grow on the same land before.

Seventy bushels of these ashes, together with a quantity not exceeding thirty bushels of mixed coal and wood ashes made by my kitchen and parlour fires, were mixed with my barn manure, derived from one horse kept in stable the whole year, one other horse kept in stable during the winter months, one cow kept through the winter, and one pair of oxen employed almost daily on the road and in the woods, but fed in the barn one hundred days. This manure was never measured, but knowing how it was made, by the droppings and litter or bedding of these cattle, farmers can estimate the quantity with a good degree of correctness. These ashes and this manure were mixed with a sufficient quantity of the mud above mentioned by forking it over three times, to manure three acres of corn and potatoes, in hills four feet by about three feet apart, giving a good shovel full to the hill. More than two thirds of this was grass land, which produced last year about half a ton of hay to the acre, broken up by the plough in April. The remainder was cropped last year without being well manured, with corn and potatoes. Gentlemen, you have seen the crop growing and matured, and I leave it to you to say whether or not the crop on this land would have been better had it been dressed with an equal quantity of pure, well rotted barn manure. For my own part I believe it would not, but that this experiment proves that peat mud thus managed, is equal if not superior to the same quantity of any other substance in common use as a manure among us; which, if it be a fact, is a fact of immense value to the farmers of New England.—By the knowledge and use of it, our comparatively barren soils may be made to equal or excel in productiveness the virgin prairies of the west. There were many hills in which the corn first planted was destroyed by worms. A part of these were supplied with the small Canada corn, a part with beans. The whole was several times cut down by frost. The produce was three hundred bushels of ears of sound corn, two tons of pumpkins and squashes, and some potatoes and beans. Dr. Dana, in his letter to Mr. Colman, dated Lowell, March 6, 1839, suggests the trial of a solution of geine as a manure. His directions for preparing it are as follows, "Boil one hundred pounds of dry pulverised peat with two and a half pounds of white ash, (an article imported from England,) containing 36 to 55 per cent of pure soda, or its equivalent in pearlash or potash, in a potash kettle, with 130 gallons of water; boil for a few hours, let it settle, and dip off the clear liquor for use. Add the same quantity of alkali and water, boil and dip off as before.—The dark colored brown solution contains about half an ounce per gallon of vegetable matter. It is to be applied by watering grain crops, grass lands, or any other way the farmer's quick wit will point out."

In the month of June I prepared a solution of geine, obtained not by boiling, but by steeping the mud as taken from the meadow,

in a weak lye in tubs. I did not weigh the materials, being careful only to use no more mud than the potash would render soluble.—The proportion was something like this: peat 100 lbs. potash 1 lb., water 50 gallons; stirred occasionally for about a week, when the dark brown solution, described by Dr. Dana, was dipped off and applied to some rows of corn, a portion of a piece of starved barley, and a bed of onions sown on land not well prepared for that crop. The corn was a portion of the piece manured as above mentioned. On this the benefit was not so obvious. The crop of barley on the portion watered, was more than double the quantity both in straw and grain to that on other portions of field, the soil and treatment of which was otherwise precisely similar.

The bed of onions which had been prepared by dressing it with a mixture of mud and ashes previous to the sowing of the seed, but which had not by harrowing been so completely pulverized, mixed and kneaded with the soil as the cultivators of this crop deem essential to success, consisted of three and a half square rods. The onions came up well, were well weeded, and about two bushels of fresh horse manure spread between the rows. In June, four rows were first watered with the solution of geine above described. In ten days the onions in these rows were nearly double the size of the others. All but six rows of the remainder were then watered.—The growth of these soon outstripped the unwatered remainder.

Mr. Henry Gould, who manages my farm on shares, and who conducted all the foregoing experiments, without thinking of the importance of leaving at least one row unwatered that we might better ascertain the true effect of this management, seeing the benefit to the parts thus watered, in about a week after, treated the remainder in the same manner. The ends of some of the rows, however which did not receive the watering, produced only very small onions, such as are usually thrown away as worthless by cultivators of this crop. This fact leads me to believe that if the onions had not been watered with the solution of geine, not a single bushel of a good size would have been produced on the whole piece. At any rate, it was peat or geine rendered soluble by alkali, that produced this large crop.

The crop proved greater than our most sanguine expectations. The onions were measured in the presence of the chairman of your committee, and making ample allowance for the tops which had not been stripped off, were adjudged equal to four bushels to the square rod, or at the rate of six hundred and forty bushels to the acre. In these experiments, seven pounds of potash which cost seven cents a pound, bought at the retail price, were used. Potash, although dearer than wood ashes, at twelve and a half cents per bushel, is I think, cheaper than the whiteash mentioned by Dr. Dana, and sufficiently cheap to make with meadow mud, a far

cheaper manure than such as is in general used among our farmers. The experiment satisfies me that nothing better than potash and peat can be used for most if not all our cultivated vegetables, and the economy of watering with a solution of geine, such as are cultivated in rows, I think cannot be doubted. The reason why the corn was not very obviously benefited, I think, must have been, that the portion of the roots to which it was applied, was already fully supplied with nutriment out of the same kind from the peat ashes and manure put in the hill at planting. For watering rows of onions or other vegetables, I should recommend that a cask be mounted on light wheels, so set that like the *drill* they may run each side of the row and drop the liquid manure through a small tap hole or tube from the cask, directly upon the young plants. For preparing the liquor, I should recommend a cistern about three feet deep and as large as the object may require, formed of plank and laid on a bed of clay and surrounded by the same, in the manner that tan vats are constructed; this should occupy a warm place, exposed to the sun, near water, and as near as these requisites permit to the tillage lands of the farm. In such a cistern, in warm weather, a solution of geine may be made in large quantities with little labor, and without the expense of fuel, as the heat of the sun is, I think, amply sufficient for the purpose. If from further experiments it should be found economical to water grass lands and grain crops, a large cask or casks placed on wheels and drawn by oxen or horse power, the liquor from the casks being at pleasure let into a long narrow box perforated with numerous small holes, which would spread the same over a strip of ground, some six, eight or ten feet in breadth, as it is drawn over the field in the same manner as the streets in cities are watered in summer.

ANDREW NICHOLS.

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I certify that I measured the piece of land mentioned in the foregoing statement, as planted with corn, on the 21st of September, 1839, and found the same to contain two acres, three quarters, thirty-one rods.

JOHN W. PROCTOR, *Surveyor.*

[*New-England Farmer.*

(To be continued.)

ON THE VALUE OF FIELD PEAS AS A CROP, AND TO PREVENT INJURY TO STOCK FEEDING THEREON.

Hancock County, Ga., April 13th, 1840.

To the Editor of the Farmer's Register:—I have for several years placed a high value on the pea crop, as peculiarly adapted to our agriculture and wants in this section. It appears to me more fertilizing than any green crop we grew, grows taller on poor land, is easily planted, does not hinder us much during the busy season, and in every way, is a fine accompaniment to a corn crop, and furnishes a fine amount of fall and winter provender for stock (which we are generally much wanting;) but I have heretofore thought it left my stock, particularly my hogs, in an unhealthy condition, and on that account less valuable than it at first promised.

I have used much inquiry and thought to find a remedy for this defect, and hope I have succeeded; but it will be necessary to test the remedy more fully, and on that account I send it to you, if you think it worthy, for the use of your subscribers.

Last fall I was conversing on that subject with a very honest practical farmer. He told me for a number of years he had used the pea crop in fattening the most of his stock, that they throve as kindly on that as on corn, and that none were injured by it; and he gave me his plan. He prepared in the pea field a large tight trough, and kept it at all times well supplied with salt and ashes, dissolved in water. He never turned hungry stock into the field, only turning in his horses, cows and fattening hogs. I tried it last season, and the result was precisely as he informed me; they all appeared fond of drinking out of the trough, and were healthy, and did well after they were turned off on other food. I used the precaution to turn my horses and cows off one or two days each week, and I would suggest that horses or oxen should never be put to hard work while filled with peas. Nor would I suffer my stock hogs to feed on them; they are I think more unhealthy for young than older hogs.

I cannot close this without giving you a *hearty* "well done" for your bank comments in the Farmers' Register for March, and the political essays in the second number of the 'Southern Magazine.'

J. S. WHITTEN.

[*Farmers' Register.*

BEST METHOD OF IMPROVING NEW FARMS.

To the Editor of the Western Farmer:—In answer to "an inquiry" over the initials of "O. S." in the 4th No. of your valuable paper, under date of March the 3d, permit a friend of agriculture to suggest to your Tuscola correspondent, a few ideas in relation to his inquiry, which, perhaps, may prove beneficial to him, if not of interest to your readers generally.

If Tuscola be situate in a district of country heavily timbered with oak, maple, beach, bass wood, ash, &c., together with a heavy growth of underwood or brush, the best method in the opinion of the writer, or at least that has fallen under his observation, to clear such land is, if it be undulating and dry, to enter in the months of June, July or August, upon the land to be cleared, when the leaves are large and full, with *axe and bush hook* in hand, (not forgetting the jug of small beer, or pure cold water, and cut down all the trees and brush of and less in size than six or eight inches in diameter, on the first five, ten, twenty, or more acres, according to the means at command, leaving the larger trees standing.

Trim up the fallen trees by lopping off the branches, and then cut up their branches into suitable length for rails, or to be thrown together into piles for burning, leaving the brush scattered over the surface of the ground to dry. The next step recommended, will be, after the leaves have fallen from the trees in the fall of the year, and before the buds start out in the spring, to girdle the timber or trees left standing so effectually as to kill them; and as soon thereafter as the weather will permit, (if the season be favorable, the last of April or first of May,) put fire to your "fallow," and the probability is, you will get a "good burn." When once cleared off, put on a brisk team of young cattle or horses, and harrow up your land thoroughly till it becomes mellow and pliable to the hoe; you may then plant it in corn or potatoes, or sow it to oats or other spring grain, at your option, or as your wants may dictate. If you sow to oats, you can immediately seed down after them to 'timothy grass,' 'red top' or 'clover,' which will soon furnish your farm with hay for your stock of cattle, &c. Nor will the 'girdlings' become dangerous to your cattle, or prove detrimental to your crops for the first three or four years, and in the mean time they can be cut down and used for rail timber, or fire wood, and being dry, can be burned out of the farmer's way at almost any season of the year when he may have the most leisure time to do it.

It being generally the case with those hardy industrious men who most frequently break in upon new farms, that they are limited in their means, and having families to support, and some of them large ones too, they require a quick return of the outlay of their small capitals. And this method of clearing the first forty acres of tim-

bered land, if pursued, will place a family in circumstances to raise their own food for consumption, sooner than any other, as much labor, time and expense are thereby saved the first year or two, while the new beginner is beginning anew with every thing new around him. If "openings," "prairies," or "plains," are to be worked, where there is a heavy coat of herbage upon the ground, and no obstacles in the way of the plough, in the month of June or July enter upon the land to be broken up with a sufficient team to turn over the sward with ease, while the wild grass and herbs are yet tender and vegetating.

The depth of ploughing should be regulated according to the depth of soil. And as a general rule, prairie can be ploughed deeper than either openings or the willow plains. "Oak openings," the first ploughing should be turned over to the depth of about six inches, and great care must be taken to turn a "*clean, handsome furrow*," so as to cover entirely the vegetable matter, for one acre well ploughed and tilled, is better to the farmer than five but half-done, and if the *whiskey bottle* is suffered never to enter the habitation nor the field, and proper care be taken, the farm work is sure of being not only seasonably, but well done. The land thus ploughed should be suffered to lie in fallow, undisturbed until the following spring, when it may be cross ploughed, harrowed and prepared for spring crops.

It may be well, perhaps, here to advert to one reason why the first ploughing in openings or plains, where the sub-soil tends to clay should not be made too deep. Argillous soil, in its natural undisturbed state, lies in a compact firm layer, and is of a cold sour nature; and as new beginners are somewhat impatient for early crops, they cannot wait for the seasons with their accompanying attributes of heat and frost, shower, and sunshine, to modify and subdue the natural sourness of a clayey soil if ploughed to the depth of ten or twelve inches at first; so therefore, as soon as the vegetation and mould which were turned under at the first ploughing, have sufficiently rotted to mix with the under soil that was turned up, and which being thin, (if ploughed but six inches,) and lying over a compost formed of the vegetable matter soon macerates, by exposure and the air and changes of the weather, and will if planted or sowed, yield a tolerable crop, the time is improved by the new beginners, to avail themselves of the earliest possible harvest. And furthermore, as all newly cultivated lands, if properly managed, will yield a yearly increase of the products of the soil for the first five or six years; the depth of ploughing can be gradually increased without materially lessening the productiveness of the crop. At the same time the farmer is receiving a rich reward for his care and labor. As I have already occupied a large space of your useful columns than may be interesting to most of your readers in partly answering a short inquiry, I shall close by observing that if your

"Tascola" correspondent, "O. S." needs any further information on the subject, after he shall have cleared or broken up the first ten acres of land, by so intimating through the medium of the Western Farmer, he can be accommodated by "CINCINNATUS."

Lapeer County, March 20th, 1841.

[*Western Farmer.*

OBSERVATIONS ON THE EXCRETORY POWERS OF PLANTS, &c.

THE lately discovered doctrine of the excretory powers of the roots of plants, although it was rather startling to us, and slowly received at first, is now beginning to be embraced by the generality of scientific men. The doctrine being first adopted and promulgated by several leading men, about the same time in England as well as on the continent, gained for it a ready acceptance with many, who, however had some difficulty in explaining and proving what they professed to believe. That the soil immediately in contact with the roots and other parts of the plant which grows in it, must receive some kind of taint, either by exudation, respiration, or other mode of discharge of its fluids, is perfectly feasible, and that this taint is appreciable by our senses, both of sight and scent, is undeniable. But whether this taint or discharge from the plant be *poisonous*, or only *useless* to plants of the same kind which succeed, is the question not yet clearly decided. Objectors insist that it is not what *is left* that is deleterious, but that which is *taken away*, which renders the soil less suitable to the second crop of the same kind. Every different species of plant, say they, selects its own peculiar kind of food, and therefore the second cannot find so much as the first, unless the exhausted plot be replenished with that of which it has been deprived. But the abettors of the exudation notion, say this is impossible; that no replenishment of even the richest dress will operate so as to make the second as good as the first crop. This is perhaps carrying the idea of excremental poisoning too far; because a farm may be so exhausted under a *regular rotation* of cropping as to be at last unfit to bear any kind of crop until again visited by the dung cart. We often see in cottage gardens onions and cabbages repeatedly grown on the same spot, without any material falling off, provided the annual application of ashes and other sweepings about the house are bestowed to assist the crop.

It is quite possible, however, that one species of plant may be not only unhurt by the exuvia of another, but even thrive in it, as beans and wheat are known to do, alternating for many consecutive years. And moreover, as beans drilled and properly labored by horse and hand hoes, are a cleansing crop, and if the drills of this year were to occupy the intervals of those of the last, it might be possible, as Tull used to say, to grow beans every year upon the

same field; but this, for many reasons, would not be eligible, even if practicable.

But some of those who strenuously support the theory of Professor De Candolle, relative to the injurious ejectments of previous crops, not only insist on the validity of the Professor's opinion, but maintain that it is consistent with a fixed law of nature, that no plant is destined by nature to occupy constantly the same station. That they are continually endowed with powers or tendencies by which they desert or fly from the place of their birth; as if by a kind of perception they knew that their parents had devoured all the food which they would require for themselves.

We have many instances of the progeny forsaking the mother, some seeds have parachute wings to fly away with, which when acted upon by the heat of the sun, burst with such elastic force as to scatter the seeds to a considerable distance around. By many other means are seeds dispersed: by winds, by currents of water, by birds and other animals. But besides seeds, plants have other modes of increase or extension; witness the numerous offsets and suckers produced by many different sorts of plants, and all these take divergent directions, so that they should not rob the parent or be starved themselves. The strawberry plant is a familiar example of how far the living projeny depart from the mothers' station before they fix themselves in the ground. To these instances a hundred others might be adduced; all which go to prove that plants are constitutionally inclined to a change of place. Trees indeed are fixed to one spot; but they are ever finding fresh pasture by the extension of their leading roots, as is the case with all other perennial plants.

But, after all, the question recurs—is this diverging tendency a natural law of vegetation, or is it because antecedent production exhausts or poisons the soil, so as to render it unfit for the purposes of subsequent production?

We know that newly broken up land, whatever its quality may be, is always more suitable to any crop than that of the same quality which has been long cultivated; showing that there is a *something* in maiden soil which is fugitive. What that something *is*, has never been discovered by practical men, nor has it been investigated by the chemist, though an object well worth the researches of science.

That the fertility of exhausted land may be renewed by additions of manure is well known; and it seems that the dress restores that which has been abstracted by the previous crops; or at least, supplies a substitute. On the knowledge of this fact, all our best systems of agriculture are founded, and whether land be exhausted or poisoned by previous cropping can make no difference in the culture, so that the rules of rotation, as established by long expe-

rience, are strictly attended to, and no cross-cropping pursued, unless for some manifest prospective advantages.

That a change of soil, and even a *change of air*, are beneficial to all kinds of terestrial plants, are well confirmed facts; and nothing conduces so much to the advantage of the farmer as a frequent change of seed. Now, how a change of soil without its being of better quality, and especially how a *change of air*, without reference to its temperature, can be so exciting and congenial to foreign and strange plants, is one of those mysteries in cultivation which we cannot readily fathom. It must be observed, however, that such effects are only seen between the fortieth and sixtieth parallels of latitude; because beyond those bounds an interchange would be too extreme, though there are some exceptions to this rule, for the Mazagan beans of Egypt do well in this country, and some native plants of Siberia do equally well in Britain. But the farmer's range in making such changes is confined to the seed of corn, grasses, potatoes, &c.; and, next to obtaining clean seed of the *best varieties*, most suitable for his own land, is the procuring them from the most distant parts of the kingdom, or at least from some neighboring country.

CATTLE.

THE best cattle have the face rather short; the muzzle small; the horns fine; the neck light, particularly where it joins the head; the chest wide, deep and capacious; the tail broad and flat towards the top, but thin towards the lower part, which it will always be, when the animal is small boned;—the lower part of the thigh small; the legs short, straight, clean, and fine boned, though not so fine as to indicate delicacy of constitution; the flesh, rich and mellow to the feel; the skin of a rich and silky appearance; the countenance calm and placid, denoting the evenness of temper, essential to quick feeding and a disposition to get fat.

Every breed of animals which has, through a few generations (two or three is sufficient,) been overfed, requires similar feeding; and the offspring of such animals require and can digest more food than others, who have lived upon little.

All growing animals, including mankind, ought to be sufficiently well fed to preserve health and strength, but never to be stimulated by excess of food. The children of parents, however, who have through many generations, been well fed, would perish if given no more food than would be sufficient for an Irish or Highland Scot's peasant child.

The chief qualities sought for in cattle, are the tendency to fatten on little food, and that to yield abundance of rich milk. The

tendency to fatten is indicated chiefly by the capacity of the chest. Animals of all species, says Mr. Knight, all other qualities being equal, are, I think, capable of labor and privation, and capable of fattening, nearly in proportion as their chests are efficacious; but the habits of ancestry will operate very powerfully.

It is the width and depth of frame, says Mr. Berry, which confers weight, and not the mere circumstance of great height. While equally great, if not greater weights, can be obtained with shorter legged animals, they are, independently of other recommendations, generally found to possess better constitutions and greater propensity to fatten.

Mr. Knight says, the constitutional disposition to form fat, is certainly hostile to the disposition to give milk. Cows which give little milk often present large udders, which contain much solid matter; and, to inexperienced eyes, a two years old Hereford cow would give a promise of much milk, where very little would be given. A narrow forehead, and a long face, nearly of the same width from end to end, as in the Alderny cow, certainly indicates much more disposition to give milk than the contrary form, which I have pointed out as indicative of a disposition to fatten.

Fat animals are more generally those of the north, where the cold diminishes sensibility. Fat, indeed, appears to be the means which nature very extensively employs to lower insensibility by interposition between the skin and the central parts of the nervous system. Fat animals, accordingly have not only less sensibility and irritability of the skin, but of the organs of sense generally. Thinner animals, on the contrary, are more generally those of the South, and have more acute sensibility and exquisite sensation.

In reply to this observation, Mr. Knight says, I do not doubt but you are right respecting the use of fat in cold climates; all sleeping animals, through winter, go to sleep in a fatted state. I do not think that breeds of cows, which give much rich milk, are very hardy.—The Alderny cows are what the Herefordshire farmer calls very *nesh*, that is, very incapable of bearing hardship of any kind, and particularly cold, consequently of greater sensibility.

Cows which have much milk, have the power of eating and digesting much food, and they require, whilst they give much milk, a very abundant and good pasture. The breeds of cows which give less milk, and present greater disposition to become fat, are generally less *nesh*, and will fatten upon less food. The influence of the feelings is very considerable. I have observed that whenever a young Hereford cow disliked being milked by the dairymaid, she soon ceased to give milk; and I do not doubt that, in all cases, if the calves were twice every day permitted to suck after the dairy maid had finished her labor, the cows would longer continue to give milk, and in larger quantity.

This tends to corroborate what has been said as to greater sensibility being favorable to milking.

If this led only to distinction of these two kinds as to milking, namely—that of fatness and thinness, and that of smaller and larger organs of sense, and greater or less sensibility, it would still be valuable, as showing, either at a later or an earlier period, what we may expect in this important particular. But perhaps its utility may extend still further, and enable us to improve the race.

It may form a basis for our determining whether, in endeavoring to improve a breed, fatteners may most easily become milkers, to some extent; or milkers may, to a similar extent, become fatteners; and what are the circumstances which would most favor such partial interchange, if not absolute improvement? Indeed, from these principles I would conclude, that an animal fattening in the north, where a more genial temperature would render fat less necessary, would increase sensibility, and would cherish the secretion of milk, so intimately connected with that excitement of the re-productive functions which warmer climates produce.

As these two desirable qualities are both dependent upon one system, and as they are opposed to each other, (for excess of one secretion is always more or less at the cost of the other,) they will be most easily obtained by being distinctly sought for, and the animal of diminished sensibility will most easily fatten, while the animal of increased sensibility will most readily yield milk.

These views are confirmed by the conduct of the London dairymen. While they acknowledge that the Alderneys yield the best milk, they keep none of them, whatever they may pretend, because these animals are peculiarly delicate, and more especially because they cannot, after being used as milkers, be fattened for the butchers. The York and Durham cows suit them best.

In certain constitutions, however, and to a certain extent, there is a compatability between fattening and milking.

Mr. Knight says, the disposition to give much and rich milk, and to fatten rapidly, are to some extent at variance with each other; but I have seen cases in which cows which have given a great deal of rich milk, have given birth to most excellent oxen, the cows, themselves, however, always continuing small and thin whilst giving milk.

I very confidently believe in the possibility of obtaining a breed of cows which would afford fine oxen, and would themselves fatten well; but, as great milkers require much more food than others, the farmer who rears oxen, does not think much, perhaps not enough, about milk, and is in the habit (which is certainly wrong) of breeding his bulls from cows which have become his best, owing only to their having been bad milkers.

In the selection of bulls, besides attending to those properties which belong to the male, we ought to be careful, also, that they are descended from a breed of good milkers, at least if we wish the future stock to possess this property.

CREAM.

The peculiar rich cream of Devonshire, England, called clouted cream, is obtained by using zinc pans of a peculiar construction, consisting of an upper and lower apartment. The milk is put into an upper apartment; and after it has stood twelve hours, an equal quantity of boiling water is introduced into the lower one. At the end of another twelve hours the cream is taken off much more easily and perfectly than in the common way, and is also more abundant and richer. The result of twelve experiments carefully made, was as follows:—four gallons of milk treated as above, gave in twenty-four hours, four and a half pints of cream, which yielded, after churning fifteen minutes, forty ounces of butter; four gallons treated in the usual way, gave in forty-eight hours, four pints of cream, which yielded after churning ninety minutes, thirty-six ounces of butter. The increase in the quantity of cream is twelve and a half per cent.

The same principle may be applied in the use of common pans. It would be easy, for instance to prepare some kind of trough, of tin, perhaps, or even wood, into which the pans could set, and hot water afterwards be introduced.

As a close trough would be much better than an open one, you may have a cover in which to set the pans. An ingenious Yankee tinman would soon make a range in this way, sufficient for a common dairy, at no great expense. It would last indefinitely. If it is true that you would thus get some two pounds more butter a week from each cow, the apparatus and trouble would soon be paid for,—to say nothing of the time saved in churning. We do not see why zinc pans—which are said to be decidedly preferable to any other for the dairy—with the tin range as above, would not be quite as good as the complicated and expensive Devonshire pans. And it would be easy for the dairy women to satisfy herself respecting the *principle*, without either. By using cold water instead of hot, the range would serve to keep milk sweet in warm weather.—*Vermont Farmer.*

SWEET POTATOES.

We were applied to, a short time since, for some instruction as to the best mode of cultivating sweet potatoes. When we inquired of our friends where we could get the desired information, we were universally recommended to a Mr. Joseph Bernard in this vicinity, who has, it seems, obtained an unrivalled reputation for the cultivation and keeping of this valuable root. Accordingly, we made

the application, and Mr. Bernard very kindly furnished us the following detailed particulars of his mode of cultivation.

He lays off a bed of any required size, say twenty feet in length by ten in width, from which he removes six inches of the surface earth; this, according to the usual method of making a hot-bed, he boards up all round, sloping to the front; the boards at the back, or north side, being two feet high, whilst the front or south side is only one foot in height. He then banks up the earth removed against the outside of the board, all round. In the bed so prepared he puts fresh stable manure to the depth of fifteen inches, after it is well pressed, keeping the surface flat and level. On this he lays fine rich mould, *free from seed of any kind*, two and a half inches deep, and upon that he places his plantings, one inch apart, and covers them with two and a half inches more of the same mould thrown over lightly, and not pressed down. This is done as near as possible to the 10th of April, and the time he considers important. His bed he covers with a sloping shelter to turn off the rains, but raised a few inches in front to admit the light and air, which is removed, however, as soon as the plants come up.

While the plants are sprouting, he takes a piece of light, poor, sandy soil, which ought to have been fallowed the preceding fall. This he again ploughs and rakes down fine and level, about the last of April. He lays off his rows with a single plough not more than two inches deep, four feet apart, running from north to south, these trenches he fills *well* with any kind of old well rotted manure; then with a single plough he turns a furrow on each side of the row, so as to put a cover over the manure about three inches deep. This depth may be attained, with care, by the use of the plough alone, without an after resort to the hoe.

Upon these ridges, levelled down smooth and even, the plants are set.

In three or four weeks from the time of planting, if the bed has been properly attended to, the plants will have attained the height of some three or four inches. When this is the case, he avails himself of such a season as is generally used for setting out cabbage plants, taking especial care that the ground is not too wet, which is even worse than being too dry. In drawing them, he places one hand on the bed, over the root, and with the other gently disengages the plant from the mother root, taking care not to injure the fibres of the root, which he wants to afford a succession of plants.

To set them out he makes a dibble of a piece of wood, about two inches in diameter, and about two and a half feet long; four inches from the bottom he inserts another piece, at a right angle, sixteen inches long, which being the distance between the plants, the instruments tapered and sharpened at the point serves to lay off the distance, and make the hole for the plant at the same time.

The plants must be set as deep as the first leaf, and the holes must be lightly filled with fine earth, taken between the fingers, and gently pressed against the plant.

When the plants have fairly begun to grow, he throws a furrow to them on each side, with a single plough, taking care not to cover the plant. Attention must be paid to keep grass from about the vines, until they begin to run freely, after which they should not be disturbed. Hence the necessity of poor, clean ground, that troubles you less with grass, which you cannot disturb the vines to eradicate.

Mr. Bernard is very careful never to cover too much vine—he assumes that every point of the vine that is covered, sends forth fibres, and produces tubercles; hence, if too many joints are covered, he would have a great quantity of small potatoes, instead of a lesser number of fine ones. His plantings, on the contrary, he obtains by pursuing this course of frequent covering.

This is Mr. Bernard's mode of cultivation; his method of keeping, which is peculiar, and which has been very successful, shall be given in a subsequent number, before the period when it will be required. This though we will suggest at present, that Mr. Bernard is fully satisfied that potatoes raised upon a limed or calcerous soil are much easier kept than when they are raised upon land wanting that property.

Mr. Bernard is a plain, sensible, practical man, who was raised at the north to the business of farming. He began here with sixty acres of poor land, which he has increased in value from ten to forty dollars per acre, and in four years, he has cleared two thousand dollars, besides supporting his family, from sixty acres.

He considers the sweet potato by far the most valuable root crop he has ever seen, and declares that if the northern climate permitted its cultivation, it would supercede all other root crops in that section. He says that he has found it fully equal to Indian corn for fattening beeves, and much superior for his hogs. He has killed hogs fattened on potatoes alone, and found the fat as firm and fine as that made by the corn itself. As a food for stock he thinks nothing can be superior to it.

The sweet potato vine he thinks an extraordinary fertilizer, and is very sure, that when turned in it affords a great deal more to the land than the root takes from it.—*Southern Planter.*

HORTICULTURE.

VEGETABLE GARDEN.

CELERY—Apium Graveolens.

The cultivated celery has come into much repute within these forty years. The leaf-stalks, when blanched, are used raw as a salad, they are slso stewed, and often used to flavour soups. The white stalks of celery are stewed and sent to table in white sauce. An agreeable conserve can also be made of the blanched stalks of celery. The root only of celeriac is used. It is said to be excellent in soups, in which, whether white or brown, slices of it are used as ingredients, and readily impart their flavour. The seed of the celery contains a great portion of its aromatic scent and taste, and when neither the blanched nor the green leaves can be had, a small quantity of the seed forms an excellent substitute for flavouring soups, &c.

The following are the principal sorts cultivated in our gardens:

1. Dwarf Italian.—The stalks of this sort are hollow. It has long been an inhabitant of the English garden, but is now partly superceded by the two following varieties, excepting for an early crop.

2. Red Solid Stalked, or Manchester, by which name it is sometimes called, from its being cultivated in the vicinity of that town in the greatest perfection. This sort occasionally, in rich ground, grows to an immense size, some being known to weigh from six to eight pounds after being washed or cleansed. It is of a very hardy nature and will admit of being blanched, if required, to the height of four feet. It is more hardy, but not considered quite so delicate as the following.

3. White Solid Stalked is of the same quality as the red, but is more generally preferred on account of the colour; there is, however, little real difference between them, excepting in that particular. The finest celery the author ever saw, was in the royal gardens at Kensington, while on a visit to that worthy man and excellent gardener, Mr. Forsyth, who called the author's attention to a most superb sample of celery, blanched to near four feet in height, of a clear white, with solid, crisp, and well-flavoured stalks.

4. Turnip-rooted or Celeriac, a name by which it is known on the Continent, is there in high estimation for soups; and from the information given to the author by an English cook, it imparts a more agreeable flavour to the soup than the upright. It has, besides, another good quality, that after being well boiled, it forms

a principal ingredient in the salad mentioned under the name of beet-root.

Culture.—When early celery is required, which is generally the case in most families, the seed of the two first varieties (but little of the former, as from being sown so early it is apt to run,) should be sown on a slight hot-bed of well prepared dung, about eighteen inches thick, on which six or eight inches of light rich soil should be laid, and covered either with a frame or hand-glass. After the heat has risen perfectly, level the surface, and sow the seed the first week in February, but not so immoderately thick as is generally practised; over which sift a very thin covering of light mould, and give the whole a slight watering from a fine rose pot, to cause the seed to germinate the sooner. When this is done put on the glasses, and as soon as the plants appear, air should be admitted according to the state of the weather. When the young plants have grown two or three inches high, a few may be planted in another frame, at about three inches apart, to forward their growth; and the remainder, in a week or ten days' time, should be planted out in a well prepared bed, three or four feet wide, to be hooped over, and occasionally covered with mats in ungenial weather. In about a month or six weeks, those planted in a frame, supposing they are properly hardened, will be of sufficient strength to plant out in trenches for blanching. For early use the author planted a row or two of the Italian sort in deep drills, drawn with a drill hoe at two feet apart, when they are sufficiently blanched in a few weeks for use. This, however, is mentioned merely as an experiment. The regular way is to select a level and rich piece of ground: dig some trenches a foot wide, eight or ten inches deep, and three feet from each other; if convenient, from north to south is preferable to any other aspect: let the earth be regularly thrown out on each side of the trench and sloped off. When one trench is opened, five or six inches of well-consumed dung should be worked in full half a spade deep, and so continued until the requisite number of trenches are finished. The plants which were pricked out in the beds or frames, may now be taken up and prepared for planting, which is done by cutting off the extremity of the roots (which in planting should have a gentle twist,) shortening their tops or leaves, but not so low as to injure the young centre leaves, and clearing the neck of the plant from suckers; this done, they will be in order for planting in the trenches at the distance of four or five inches apart, after which, give the whole a good soaking of water. Little after culture is required, except using a small hoe at times, to stir the earth round the plants until they are of sufficient growth for the first earthing; that is, when the plants are about a foot high.—When they are of that height, let the earth be pared down on each side of the trench, care being taken not to let it get into the hearts of the plants; then with one hand gather up the leaves, and with

the other draw the loose earth against the plants, so as to keep them compact and upright: when the lines are thus finished, a more considerable quantity of earth may be pared in against the plants. In about three weeks, as the plants proceed in growth, they will require another earthing up, and will soon afterwards be found sufficiently blanched for use. The longer the plants remain, the more earthing up they require. In taking up the plants for use, it is best to begin at one end of the row, and dig clean down to the roots, (which then loosen with the spade,) that they may be drawn up entire without breaking the stalks.

The next successive crop to be attended to, is what is generally called the principal. The seed of the red and white solid stalked varieties is to be sown on a warm spot of rich mellow ground, the first week in March, and raked in lightly and regularly.

When the plants are two, three or four inches high, thin the seed bed, and prick out a quantity in beds three or four inches apart, as advised for the early sowing; water them; and if the weather is warm shade them for a few days, until they have struck root. They remain in the bed for four or five weeks, till they are from six to ten inches high, and have acquired a stocky growth. They are then finally transplanted into the trenches for blanching, exactly similar to the early crop. If large celery is wanted, they have only to be planted a little wider apart in the lines. As the plants advance in growth, let them be earthed up on each side firmly and evenly, and in a sloping direction from the surface to nearly the top of the leaves. In that state the celery will remain sound and good for a length of time, and on the approach of frosty weather, if likely to be lasting and severe, a quantity of dry litter should be spread over the plants, which will not only protect the celery, but enable it to be readily taken up as wanted for use.

When the celery is full grown and the blanching completed, it soon begins to decay: hence very fine looking celery is often found to be rotten at the base of the leaf-stalks.

From the last sowing in March, the author has found that such plants as were left in the seed-bed, if taken up in September and planted in deep drills, at two feet apart, will, if occasionally earthed up, form a good substitute when the principal crop is used, or destroyed by the weather.

The different earthings up of celery should always, if possible be performed when the plants are dry; since, where this is not attended to, they are apt to become spotted and cankery.

The celeriac is but partially cultivated in this country, and not nearly so much as it deserves. It is propagated by seeds sown in a light rich spot the first week in March. When the plants are two or three inches high, they should be thinned out to three or four inches apart; and when five or six inches high, transplanted into deep drills or shallow trenches, at six or eight inches distance in

the lines, and watered according to the weather (the whole of this species being partial to moisture.) As the plants advance in growth, observe the progress of the roots; and if they have acquired a tolerable size, draw some earth up on each side of the row, three or four inches high, which will render them white and tender, and particularly so when it happens to be a moist season. In about six weeks after being earthed up, they will be in good order for use, and will continue so until the inside is observed to get hollow or unsound.

CRESS.—Lepidium.

There are three varieties at present in cultivation:—

1. Curled leaved, which besides being used as small salading, like mustard, is employed as a beautiful garnish.

2. Plain-leaved, is most commonly cultivated, on account of the difficulty of procuring the seed of the former genuine; it has also the same flavour, but is not so handsome in appearance.

3. Golden cress, which much resembles the curled, but is rather more slender in growth, and very dwarf. It has a mild and delicate flavour, and affords a pleasant addition to our stock of small herbs.

All the sorts are equally good, and, together with mustard, form the principal ingredients in winter and spring salads, and with some families all the year round.

Culture.—This sort of herb should always be cultivated so as to grow as rapidly as possible, being cut while perfectly young and in a crisp state. It is raised by sowing the seed as wanted for use, at different seasons of the year, where a constant succession is required; and to have the crops delicately young, once a week or fortnight will be found too often. The sowings in the open ground commences about the second or third week in March, according to the mildness of the weather. Prepare a piece of rich, well-dug ground, by raking the surface very fine; sow the seed in small flat shallow drills or very thickly broad-cast; earth over very lightly, and but just enough to cover the seed. In warm dry weather give occasional waterings. In the early spring and autumn crops, if the seed is sown thickly on a small square piece of ground, and covered with a hand-glass, it will forward the crop considerably.

The late autumn and winter crops will require a slight bottom heat under glass; the soil for that purpose should be light and mellow, such as old tan or vegetable mould, the seed to be sown in shallow drills and covered very slightly.

Where there is a pinery or fruiting house in work, small salading of any description can be sown in shallow boxes filled with the light vegetable mould, whereby it can be had in the severest season with little or no trouble.

Double the quantity of cress should be sown to that of mustard, as it is not of so rapid and large a growth, and to keep up a proper succession, two sowings of mustard will be necessary to one of cress.

CUCUMBER.—CUCUMIS.

There are many sorts of cucumbers in cultivation. The author has selected the following as being dissimilar and most worthy of cultivation, either in forcing frames or in the open air: and he will begin with the variety which laid the foundation of the fine cucumbers exhibited in this country during the last sixty years.

1. The Southgate, so called from a village near London, where this fruit was raised in the greatest perfection as to moderate length, symmetry of growth, and colour; and being of a more tender nature than the common long prickly, is principally recommended for early frame-work, as are all the sorts which have originated from this stock, for which there are numerous claimants, each sort being considered by its possessor as the best. Hence the only advice the author can give to the young horticulturist, to procure a really good cucumber, is to apply to some respectable seedsman or brother gardener for the seed of their best sort.

2. Long Green Prickly. This is a hardier sort than the Southgate, but not so early; it is the most proper for hand-glasses and for various culinary purposes. It commonly grows from seven to ten inches long, and has a dark-green skin, covered with small prickles.

3. Short Green Prickly, is one of the hardiest and earliest sorts, and the best for the open ground. It is also the most prolific in producing the small cucumbers for pickling. The village of Sandy, in Bedfordshire, has long been famous for producing cucumbers in the open air; and, in the season, whole wagon loads are sent weekly to the London markets, not only for pickling, but in a more mature state for culinary purposes.

4. Long Smooth Green Turkey, grows to a considerable length and thickness, is very fleshy, and proper for mangoes and pickling when very young. It is not a sort much cultivated for very early crops.

5. Long White Turkey differs from the above in having a number of spines scattered over the surface of the fruit. The stalks and leaves grow to a large size, and by some it is considered less watery, and of a better quality.

6. Long White Spine, a delicate cucumber, generally grows from eight to ten inches long; the fruit is white with small black prickles, and not so watery, and with fewer seeds than most others of the green variety. It is preferred by some families for the table, but is an indifferent bearer. The author has to remark, by way of caution, that where the white varieties are propagated, they should

be kept totally distinct from the green, provided the seed is saved from either colour, otherwise they will certainly degenerate; and no seed should be saved, but from such plants as are in a healthy state, with fruit perfect in growth and colour.

7. The Prize-fighter.—The author cannot well define the reasons of this appellation: perhaps it arose from its obtaining the prize so often at various cucumber and horticultural shows. This sort is of late introduction, and is in every respect a good one. It grows to a large size, generally from twelve to twenty inches long, or more, is firm and well-flavoured.

As Cucumbers are much used it should be an object with gardeners to have them in the market early; directions for raising them out of the ordinary season, will therefore be given in a future page, under the head forcing vegetables, to which the reader is referred. Cucumbers may be raised in the open ground, by planting seed the first week of March, in hills four feet apart; or if the ground be light, basins formed an inch below the level of the surface would be beneficial.* Previous to planting, the ground should be prepared by incorporating a shovelful of rotten dung, with the earth in each hill, after which four or five seeds may be planted half an inch deep. One ounce of good sound seed is sufficient for two hundred hills and upwards.

Cucumbers are liable to be attacked by a yellow fly, which sometimes devours young plants; these and other insects may be killed by sowing tobacco dust, soot, powdered charcoal, and the like, round about the vines when they first come up. After this is done, the plants may be thinned to two or three in a hill, and the ground carefully hoed, drawing a little earth round them at the same time. The vines should be kept free from weeds, and if the weather proves dry, a gentle watering now and then, given in the evening, will be of considerable service.

Picklers may be raised by planting the seed at any time in July. When the vines begin to bear, they should be looked over, and the fruit gathered as fast as it becomes fit, as the plant will cease to bear much, if the fruit be permitted to get yellow.

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* The term hill is frequently made use of by gardeners and farmers, to designate a situation allotted for a given number of seeds, whereas, such seeds are more frequently deposited below the level of the surface than above it; yet, as the plants progress in growth, hills are frequently formed around them, which makes the term applicable, or rather reconciles the apparent contradiction.

THE FLOWER GARDEN.

ON THE CULTIVATION AND PROPAGATION OF THE PINK, (DIANTHUS,) MORE PARTICULARLY THE CARNATION, PICOTEE, AND PINK,

BY S. WALKER.

THE CARNATION.

MODERN Florists value this plant highly, and distinguish it into four classes. First, *flakes*, of two colors only; the ground white, with a large stripe of scarlet, crimson or other color, going quite through the petals. Second, *bizarres* (signifying odd, irregular;) with flowers striped or variegated with three or four different colors, with irregular stripes or spots. Third, *picotees*, *piqutees*, or *piquetées;* edge fringed, usually having a white ground, with spots or small stripes of scarlet, red, purple, or other colors. To enumerate the varieties would be useless, says Green, as they are not permanent, and every country producing new flowers almost every year, which, though at first raising they may be greatly valued, in two or three years become so common as to be of little worth, especially if they prove defective of any one good property, and are turned out to make room for *new sorts*. I will therefore refer my readers to the lists of the florists and nurserymen, who import them or raise them from seed, who have a great variety under pompous names. The following are what the florists call the good properties of a carnation. The flower-stem should be strong, and able to support the weight of the flower in an erect position. The petals should be long, broad, and stiff, and easy to expand, or as the florists term it, should make free flowers; the outer circle of petals should turn off gracefully in an horizontal direction, and should be sufficiently strong to support the inner petals, which should diminish in size as they approach the centre. The petals should lie over each other in such a manner, as that their beauties can meet the eye at once; the middle of the flower should not advance too high above the other parts, and the edges should be entire, without fringe, notch, or indenture: the color should be bright and equally marked all over the flower; the flower, when blown, should be very full of petals, and the outside perfectly round; the stem should not only be strong but straight, not less than thirty, nor more than forty-five inches high; the flower should not be less than three inches in diameter, and the petals well formed—neither so many as to appear crowded, nor so few as to appear thin; the lower, or outer circle of petals, commonly called the guard leaves, should be substantial, and rise perpendicularly about half an inch above the calyx; the calyx should be at least an inch in length, and sufficiently strong at the top to keep the bases of the petals in a close and circular body.

PROPAGATION AND CULTURE OF THE CARNATION.

HAVING obtained a quantity of good seeds, prepare a proportionable number of pots or boxes, filled with soil mixed with rotten cow-dung, &c., incorporated well together; then sow the seed and cover them with about a quarter of an inch of the same compost, sifted finely; place the pots or boxes in an airy part of the garden; keep the soil moist, and shade them from the mid-day sun and heavy rains. The time for sowing the seed is about the first of May; in about twenty days the plants will come up, and, if kept clear from weeds and duly watered, they will be fit for transplanting about the first of August, at which time prepare some beds of the same compost as they were sown in, in an open, airy situation; plant them in rows, about ten inches apart in the row, and twelve inches from row to row; during the winter, cover the plants with pine boughs, or any other light covering;—by these means they will generally flower the following summer. When they begin to shoot up their stalks to flower, they ought to be supported by sticks, and attentively looked after as soon as they begin to blow, to ascertain which of them promise to be good flowers; pull up all single and ill-colored flowers, to allow the others more air and room; propagate the good ones by layers.

TO PROPAGATE BY LAYERS.

AFTER you have made choice of such shoots as you intend to propagate, and have loosened the soil round the plant, and if necessary, raised it with fresh soil, that it may be level with the shoot intended to be laid down, strip off the leaves from the lower part of the shoot, and cut off the top of the leaves; make choice of a strong joint, the third or fourth from the crown of the shoot; then with a sharp knife make a slip close below the joint, about three fourths through the shoot, from the joint upwards; remove the swelling part of the joint where the slit is made, so that the part slit may be shaped like a tongue; for if the outer skin be left on, it will prevent their pushing out roots; then make a hole in the earth with your finger, just where the tongue in the shoot is to come; put into the hole about a tea-spoon full of slit, or fine sand from the river; then with your finger and thumb gently bend the shoot into the earth, observing to keep the top as upright as possible, that the slit may be open; and, having provided forked sticks for the purpose, thrust one of them into the ground so that the forked part may take hold of the layer, in order to keep it down in its proper place; then cover the shank of the layer with soil, giving it a gentle watering, which should be repeated as often as it is necessary to promote their taking root. They will have taken root in about five or six weeks; cut them off from the parent plant, leaving about an inch of

the stalk below the incision attached, and plant them in pots or beds, or in the borders, as you intend to bloom them. The soil suitable for the carnation and pink is rich maiden loam, to which add one third part of well rotted cow-dung, and about one sixth part of drift sand from the side of the river, or other water courses; to this add a small quantity of air-slacked lime, say a quart to a barrow full, and about double the quantity of wood ashes; mix these well together several times in the autumn and spring, and use it the second season; protect your compost with boards from the drenching rains and the mid-summer sun.

TO PROPAGATE BY PIPINGS.

THE piping of the carnation is not attended with as much success as the piping of the pink. Our warm weather, during the months of July and August, is much against this method of propagating the carnation; even in England not more than one half of the pipings that are put in ever take root; and were it not that some of the best sorts make very little and very short shoots, and are also very brittle, and difficult to propagate by layers, I should recommend that the piping of carnations should be discontinued; but, as the most difficult sorts to propagate are generally the most valuable, I will make a quotation from Paxton, which appears to me to contain the best information on this subject. Prepare a slight hot-bed in an eastern aspect, and as soon as the heat is moderate, lay on about six inches thickness of light mould, sifted finely. No piping should have less than two or three complete joints. Take off the cutting horizontally, just below the second or third joint, and merely cut off the leaves from the joint that is to be inserted into the soil, but leave the others entire, except the tops, which cut off square, a little above the centre of the crown of the shoot. After giving the earth of the bed a moderate watering, place on a hand or bell glass to mark the boundaries in which the pipings are to be planted; plant the pipings half an inch deep, and at least an inch and a half or two inches distant from each other. Many authors, and among the number Paxton, say, not more than an inch apart. This I conceive to be an error, and one of the causes of failure in piping; by crowding too many pipings under the glass, they hold too much moisture, and damp off. After you have put in all your pipings, give them a gentle watering, to fix the soil closely about them; let them remain uncovered until the leaves are dry; then place on the glasses, and press them gently down to prevent the admision of air; give the pipings a little morning sun, but always shade them when the heat becomes strong, which may be done by covering the glasses with mats. It is necessary, after the first week, that the glasses be occasionally taken off to admit air, but this must never be done when the sun is powerful, but rather in cloudy weather, or early in the morning. When the pipings are watered, never place the

glasses over them until the leaves are dry, and then not without first drying the glasses, or mildew will be the consequence; and this must be continued until the pipings are well rooted, which will be in about six weeks, when the glasses may be removed altogether. When there are any very choice varieties, I would recommend that they be piped with tumblers, and put only one piping under each glass. I have almost invariably succeeded in this manner, when the piping in mass has been nearly if not quite a failure.

THE CULTIVATION AND PROPAGATION OF THE GARDEN PINK (DIANTHUS PLUMARIUS.)

THE pink is more hardy than the carnation, and may be propagated with success, by dividing the roots in the spring; but as these divisions never make such good plants, or bloom so fine as layers or pipings, it is a desideratum to raise new plants every year, either from layers or pipings, as one year old plants bloom very superior to those of any other age. When your pipings are prepared, make choice of a shady part of the garden; let the soil be light and sandy; put your pipings in after the same manner as recommended for the carnation, watering them with a fine rose watering pot, until the soil is completely saturated; cover them with a hand glass, which should not be removed until they begin to grow; after that they may be exposed in the morning and evening, until they are able to bear the open air. The usual time for piping the pink is July; but I have succeeded much better when I have attempted it in September. Our dog-day weather is generally very much against the propagating of pinks by piping. The pink may be cultivated from seed in the same manner as the carnation, and in the same compost, with the addition of a little horse manure. Maddock gives the following as the *criterion of a fine pink*: "The stem should be strong and erect, and not less than twelve inches high; the calyx smaller and shorter than the carnation, but nearly similar in proportion, as well as in the formation of the flower, which should not be less than two inches and a half in diameter. The petals should be large, broad and substantial, and very fine fringed or serrated edges, free from notches or indentures; in short, they approach nearest to perfection when the fringe or edge is so fine as scarcely to be discernible; but if they could be obtained entire, it would be desirable. The broadest part of the lamina, or broad end of the petals, should be perfectly white, and distinct from the eye, unless it be a laced pink, that is, one ornamented with a continuation of the color of the eye round it, bold, clear, and distinct, having a considerable proportion of white in the centre, perfectly free from tinge or spot. The eye should consist of a bright or dark rich crimson or purple, resembling velvet, but the nearer it approaches to black, the more it is esteemed: its proportion should be about equal to that of the white, that it may neither appear too large nor too small."

The importation of the pink and carnation into this country, from England or from France, is very rarely successful: the close air and the scent of the ship is, in nine cases out of ten, fatal to the plants; hence these fine and odoriferous flowers are so little known or cultivated. We, indeed, find pinks and carnations of *a certain sort*, in almost every garden, but we rarely meet with a good one.—I have met with specimens of the carnation, with high sounding name, admired by its owner for its great size; but if the color of the petals have been green instead of "brick-dust-red," it would have readily passed for a cabbage-sprout. With such specimens, how can we expect to enlist the cultivated mind and tasteful admirer of nature, in the cultivation of this lovely flower? The average price of carnations and picotees, in England, is about three shillings sterling per pair—pinks, one shilling and sixpence per pair, with a few exceptions for new and scarce varieties, which vary from five to twenty shillings per pair. I mention these facts, to contrast the prices asked and received by a gardener in this vicinity for one hundred plants of the carnation, warranted fine and of colors various!—Price paid, and I believe all that was asked, was *three cents each!* The result is, the purchaser is disgusted with his bargain; and if he had not had an opportunity of seeing better things, he might have exclaimed, in reply to the following line of the poet,—

> "And pinks of smell divinest,"
> Carnations of shapes and colors vilest.

To engage our friends in the cause of Flora, we should supply them with good things at a fair price. Taste, like truth, does not lie at the bottom of a well, nor is it confined to the rich or the poor, to the citizen or the yeoman, but it is found in all countries, and among all classes of society.

Yours, &c.,

S. WALKER.

Roxbury, August 16, 1836.

[*Gardeners' Magazine.*

CULTURE OF PELARGONIUMS.

PELARGONIA, more generally known by the name of Geraniums, from which, however, they are widely different, may be classed into three distinct natural groups. There are, first, those with herbaceous stems, including a few annuals, biennials, and perennials, which section is scarcely known in this country. A second, and more extensive division has similar stems, but tuberous roots; and of this a small portion is cultivated in large collections. The remainder, comprising by far the greater number, consists of low evergeen shrubs, the offspring of which occupy a very distinguished

position in British gardens. It is to these latter the succeeding observations are entirely directed.

Having promised, some months since, to recur to this subject, and finding several subscribers anxious to receive our sentiments and advice hereon, we shall compress into the least possible compass a comprehensive statement of our own opinions and experience, with a like compendious outline of the routine usually followed in those metropolitan establishments, where the most signal success is now commonly experienced. For the sake of facilitating reference we may arrange our individual directions under three heads, and afterwards add a slight sketch of the London grower's practice.

SUMMER TREATMENT.

Merely premising that we intend in this period to embrace the months from April to October, inclusive, we will suppose all our readers, who cultivate this tribe, to have either a green-house or frame in which to preserve them. In whatever structure they are kept, it is important, that they be grown apart from other plants, and, where practicable, in a place appropriated wholly to that purpose. Their succulent nature, excessive partiality for light, and the peculiar temperature they require at certain seasons, all enjoin the provision of a detached department, wherein every needful assistance can be duly and timeously given, without interfering with any of those distinct and very dissimilar assemblages of plants, with which they are too often associated.

For every desirable object, whether of health or luxuriance, the production of flowers, economy of labour or heat, convenience, or appearance, frames are incontestably the fittest receptacles for Pelargonia. Each of these particulars might be separately urged; but it is hoped their simple enumeration will carry conviction to all whom we address. Every one is aware that these plants are rather unsightly than otherwise in winter; that they are only ornamental while the flowers are expanded; that they cannot be too near the glass in some stages, or in too confined an atmosphere at others; and to secure their seclusion or proper management at all these epochs, they must be kept in a frame; removing them to a green-house or other show apartments only while their blossoms are in progress or unclosed.

To advert to each principal period of development, display and dormancy, in the chronological order, the time and operation of potting first demand discussion. This point should be attended to very early in April; at least, the primary translation must be effected at that time. If the season we have named be deemed too late for southerly districts, we may repeat, what has been elsewhere asserted, that no plant should be potted till its vital energies are in action. This is a safe rule, and equally applicable in the

present case as in all others. When, therefore, the shoots of any specimen solely beneath natural agency are seen to begin lengthening, the whole collection of Pelargonia should be immediately transferred to other and larger pots; for, being of a kindred nature, the same general economy may be observed with all.

The mysterious dogmatism with which some writers recommend the incorporation of half-decomposed animal, vegetable, or mineral matters in the compost used for such plants as the present, forms no part of our system. In the soil we employ, the only ingredients are fresh turfy loam, rich in quality, and friable in texture, decayed leaf-soil or light manure, a trifling proportion of silver sand, if requisite, and, indifferently, a very small quantity of heath soil, or none. The earth first specified, may be obtained from any suitable field, common, or park, in the autumn immediately preceding its requirement, or two years previously, and often turned over to reduce it to a proper degree of fineness, but never sifted. Of the whole, there should be two thirds loam, one fourth either or both of the enriching substances before mentioned, and the rest heath-soil and sand. These should, of course be thoroughly blended.

When potting Pelargonia for the first time in each year, the operator must be scrupulously guided in his clearance of the old soil by the particular circumstances in which every specimen happens to exist. If the soil is saturated with moisture, and the young shoots of the plant turgid and preternaturally excited in consequence, or if the former be very closely conglomerated into a hard mass that is likely to prove interruptive to the percolation of fluids, it must be completely shaken from the roots. This should be accomplished by placing the base of the ball on the potting bench, and striking it gently all round with the hand. Should that be ineffectual, a flattish obtuse stick, with rounded edges, must be employed; and the same implement will afterwards be found useful in adjusting the soil round the roots of others, that have not been similarly liberated. In either case, special importance should be attached to resting the roots on some solid substance; for, if held in the air large masses of soil are apt to break off at once, and tear away all the fibres with which they may be connected.

All plants whose roots are thus freed from earth, ought not to be placed in pots of greater dimensions than they originally occupied. It is a standing principle with experienced culturists, that no specimen should be allowed a larger pot till the one in which it is growing is filled with fibrous roots; and that subsequent shiftings be trifling and oft-repeated, in preference to only one or two abrupt transitions annually. This is one of the prime secrets in the right management of flowers. It induces a regular developement, both of stems and roots; wholly prevents saturation; provides for the due production of blossoms, by restraining all extraordinary exuberance; and retains the plants subjected thereto in a sound, vigorous,

and prolific condition. In short, it is a perfect *sine qua non* to distinguished, or even common success in cultivation.

Those specimens that do not need divesting thoroughly of the soil in which they are already established, should pass through the same process of a light handling on the exterior surface of their ball, in order to set the tender, nascent progressing roots at liberty, and enable them directly to diverge into the new earth. The top of the ball should also be slightly stirred with a blunt wooden instrument, that no induration in this part may obstruct the passage through every inch of its composition of the water afterwards supplied. That clean dry pots, and abundant drainage, are indispensable, is too trite an instruction to insist on here; so that we shall consider this as universally acknowledged. As a general direction, there should be from half an inch to three quarters (never more,) of vacant space between the roots of a flourishing plant and the newly-provided pot. Into this vacum the soil should be gradually introduced, and pressed in, neither loosely nor firmly, but to an extent precisely intermediate between these extremes, with the stick previously described; always conducting this last near the edges of the pot, and so as not to damage the extremely susceptive rootlets that lie on the outside. By this means all those interstices which would otherwise occasionally occur, and from several causes, might injure the plants, will be infallibly filled.

Still greater care must be exercised in distributing the soil about the roots of the sickly or diseased plants, that have been deprived of all their former compost. No instrument can be here used; but the earth is to be slowly scattered over all the roots, and caused to settle steadily in its proper position by cautiously oscillating or lifting the stem, and striking the bottom of the pot flatly on the bench. A soft but copious sprinkling of water, to complete the compactness of the earthy renewal, and invigorate the freshly-potted plant, is an invariable concomitant of this operation, and therefore may be dismissed without further mention.

We have allowed considerable prominency in our article to the foregoing point, because it is, in fact, the feature of most consequence; every other circumstance being, to a very great extent, unavailing, unless this is rightly regarded. If asked how the administration of water is to be regulated, we reply, principally by the manner in which its subject is potted, though in some degree by vicissitudes in the weather. So, when requested to offer our counsel as to the degree of light and heat needful, we are constrained to test this partly by the mode of potting; since the redundancy or deficiency of fluids, which alone render a greater or less amount of heat and light necessary or endurable, are mostly to be traced to that source. And should we be desired to explain the profuse or defective display of flowers in different plants of the same species, we can always assign this to some congenial or improper system

of shifting them. Such then, is our excuse for so elaborate an exposition of this isolated but incalculably influential process.

From the time at which the transference thus minutely detailed is achieved, to the protrusion of flower-buds by the main shoots, the superintendance to be observed is of a nearly uniform description. Further potting, the necessity for which will be determined by the manifestly straitened condition of the roots, can be conducted exactly as before. The only difference in its operation, is the less strict, and yet more gentle, rejection of the extreme outer coat of soil, as this is always, though imperceptibly, impregnated with the excretions of the spongioles so largely collected in that locality.

By a thoughtful remembrance of the native clime of Pelargonia, and a reference to the fact, recently demonstrated, that the Cape of Good Hope solar light is fully twice as intense as in England, it will be perceived that these plants enjoy naturally a far larger quantum of this refined element than we can by any method afford them. The defalcation in this respect ought, consequently, to be reduced to the lowest possible proportion. Light is to them, emphatically the most vital constituent of the atmosphere; and one, the effects of whose existence or lack, are most clearly conspicuous. There is scarcely a collection in Britain that does not suffer in some way for its insufficiency; this being mainly owing to an unfounded objection to keeping them in frames.—*Paxton.*

MONOGRAPHI OF THE GENUS CAMELLIA, OR AN ESSAY ON ITS CULTURE, DESCRIPTION AND CLASSIFICATION;

BY THE ABBE BERLESE.

Translated from the French for the Horticultural Register, by Henry S. Dearborn.

ADVERTISEMENT.

THIS work is divided into three distinct parts: the first contains a full account of the method of cultivating and multiplying the Camellia; the second, a description of the most elegant varieties, amounting to about two hundred and eighty, *—each of which is annexed to a number that has reference to a corresponding one in the two synoptical tables.

For the purpose of being easily understood by all persons, who cultivate and admire the Camellia, a simple and uniform mode has been adopted, in the descriptions, based on the most striking characteristics of the plant,—as the size of the leaves, and the form and color of the buds and flowers. All the irregularities or resemblances, which the varieties present, as well as the synonyms are

* This number has been much increased of late.—[ED. SO. AGR.

carefully designated, whenever it has been possible to do so, with certainty.

The buds have been divided, as follows, in conformity to the color of the colycinal scales—which also characterise the more or less facile development of the flowers.

1. Buds with green colycinal scales. Florescence easy.
2. " " yellowish " " Florescence less easy.
3. " " dark col'd. " " Florescence unc'n. or difficult.

The flowers have been divided into simple, semi-double, double, and full.

To prevent any doubt in the mind of the cultivator,—who may often be deceived, with respect to the preceding denominations, the definitions are here given. By a simple flower is understood, such as have but one rank of Petals; although in some varieties the sexual organs occasionally change to the petalous state. Example, Camellia, *dicanthiflora*, *insignis*, &c. These latter are flowers, which certain gardeners erroneously call double.

Semi-double are those which have but two rows of petals, with occasionally petalous stamens.

Double flowers are those which have several ranks of petals intermixed, with fertile and apparent petalous stamens, in the centre.

Full flowers have the rows of petals so multiplied, that they have the form of the hundred leaf rose.

The asterisk denotes the distinct species which have been recognized, as such, by botanists; and they are eight in number.

MONONGRAPHY OF THE GENUS CAMELLIA.

CHAPTER FIRST.

Sec. I.—THE ORIGIN AND BOTANICAL CHARACTERISTICS OF THE CAMELLIA.

The name of Camellia, first given, by Forskal, to *Ruellia grandiflora*, was immediately applied by Linnæus, to the beautiful shrub, which is the subject of this work.

Linnæus conferred upon it this name, as a testimony of gratitude to father Camelli, a Jesuit, who, in 1739, imported it from Japan into Europe.

The following are the botanical characteristics of this plant.

Perianth double: calyx, formed by the union of imbricated, squamose, rounded, concave, coriaceous and caducous bractes; corolla, of from five to seven petals,—rarely nine, equal in number to the bractes, which they exceed much in size, alternating with them, and often united at the base by their claws; stamens numerous, hypogynous, disposed in the form of a crown, filaments filiform, polyadelphian, and sometimes monadelphian, at the base

surrounded by ellipsoidal movable anthers; ovary one, oval; styles three to six, more or less connected; capsule trilocular, opening by three valves, trispermus; valve partitioned, debiscent, one triquetrous axis; seeds rare, fleshy, plump, attached to the interior coat of the petitions.

The Camellias are shrubs or trees, indigenous to China, Japan, Cochin China, and the Indies; they are glabrous, evergreen, and eminently remarkable for the beauty of their flowers.

This plant, heretofore placed near the orange, by M. De Jussieu, is now the type of a new family, formed by M. Condolle, the elder, under the name of Camellias, which is composed of the genera camellia and thea; and which that learned naturalist places between the ternstræmia and olacinia,—adding, doubtfully, that if the new intermediate genera can be posterially united, the two first orders may form but one, for the reason that the Camellia only differs from the ternstræmia by the seed.

In its native country, the Camellia rises to the height of from forty to fifty feet; but in Europe, it rarely exceeds from twenty to twenty-five, and forms a shrub of the most superb appearance, whose persisting foliage, of a glossy green, and splendid flowers, place it, without contradiction, in the first rank, among the plants of our green-houses.

Its branches are numerous, alternate, diverging, reddish when young, but ash-colored and straited in their adult age; the leaves uniformly alternate, large, smooth, generally more or less convex, thick, coriaceous, of a beautiful deep and brilliant green, margins acutely, but not deeply dentated; the flowers, often from two to three inches in diameter, of a bright cherry-red, terminal, on rising from the axils of the leaves of the superior branches; they appear, in this climate, to gladden our sight, in November and March, when the frosts have desolated our garden; this peculiarity, independently of the extreme beauty, so remarkable in this plant, has been sufficient to claim for it our preference; it may also be added, that if nature had not refused an agreeable aroma, it would be the sovereign of plants, to which no other could be compared, without disparagement.

It has not been considered proper to describe, as a botanist, the transformations which cultivation has produced, in the normal type, *(Camellia Japonica,)* by the attempts to obtain so many and such elegant varieties. There is no one who has paid any attention to horticulture, that is such an entire stranger to the science of botany, as not to be acquainted with those metamorphoses of the stamens and pistils, which constitute the semi-double, double, and full flowers, that are daily produced, in our gardens, among the families of the roses, dahlias and other choice plants.

Sec. II.—THE INCREASE OF THE VARIETIES OF THE CAMELLIA BY CULTIVATION, AND THE NECESSITY OF CLASSIFICATION.

The Camellia japonica, as has been stated, was introduced into Europe in 1739, and first ornamented the gardens of England; soon after it passed into Italy, then into France, and at a much later period into Germany. This was the only species known in Europe for forty seven years; it subsequently fructified in several countries, and furnished varieties which were long esteemed.

But in 1792, the beautiful varieties of the *White*, the *Variegated*, and *Double Red*, appeared at the same time, when, of course, the admiration for the type, immediately diminished.

Since these three first varieties, Japan and China have furnished us with others, equally remarkable, such as the *Incarnata* in 1806, the *Myrtifoli* in 1808, the *Warrata* in 1809, and finally the *Pæoniæ flora* and the *Pomponia* in 1810.

As several of these varieties, and especially the three last have fructified in our own gardens, there have been obtained from their legitimate and adulterous unions, varieties and hybrids of the most interesting character. Time, culture and accident have in their turn, induced these new products to give birth to others, which, without contradiction, equal in merit those which have been received directly from their native countries. This easy mode of re-production,—by fructification,—having become general, and as the results are continually augmenting, enlightened cultivators are united in their fears, that in the future, the numerous varieties which are daily exposed in the flower market, will soon produce great confusion, and there will be invincible difficulties to direct their course in this floral labyrinth, if a clue is not found to guide them, by establishing an order of classification, which shall quadrate with the demands of horticulture, and the trade in these universally admired shrubs.—This fear, in which we equally participate, has encouraged us to publish our ideas on the subject, and to propose a method which every one can comprehend, and accomplish, so far as our feeble abilities will permit, the object which we have proposed,—that of being useful to horticulture.

For this purpose, we have adopted the most simple and natural mode,—that of dividing the Camellias into two classes, for their general color; viz: Camellia *unicolores*, and Camellia *bicolores*.—The first class comprehends the simple colors which are more or less pure and deep; the second contains the mixed colors, more or less determinate and striking. The result of these views is contained in the annexed tables, where are explained, in an abridged manner, all these differences, besides the form, species, or variety of the Camellia, its origin, and introduction into Europe.

The more extensive details are contained in the monography attached to this work; but to understand these tables, it is essential

that they should here be preceded, by some information, as to the means we have employed for establishing the names of the different shades of color, which are generally exhibited in the flower of the Camellia.

Our first effort has been directed, to ascertain, what were the relations, which existed between the different shades of the artificial red color, with which different kinds of silk and woollen manufactures are dyed, and between the natural shades of the same red, which the flowers of the Camellia present, in order to apply the same denominations to the latter, which the artists have given to the former; but, notwithstanding our assiduous researches, to discover whether there was any resemblance between these two kinds of colors, we at last thought, that we should have recourse to the painter, who, alone, can size and imitate the various tones of color, which are so richly displayed by nature; and this thought became a resolution, which was immediately carried into effect. A very able painter, surrounded by the natural samples, which our collection of Camellias abundantly furnished, was employed, at various times, to imitate these colors on paper, and to establish, in precise terms, the specific names of the coloring materials, which he employed, to compose each specimen, in the painted representations.

This labor having been accomplished, we considered it necessary that the result should be submitted to the examination of Mr. Chevreul, one of the most distinguished men in France,—the director of the royal establishment of tapestry at Gobelins, and professor of Chemistry in the Museum of Natural History. Mr. Chevreul explained, in his peculiarly lucid and kind manner, all the ramifications of his system of colors, which has been ably developed in a scientific work, that the author will soon publish.

The examination of the system of Mr. Chevreul, has been of infinite service to us, in simplifying our labor, and has induced us to divide our colors into two series, called gamuts, containing all the tones and shades, which distinguish the varieties of the Camellia.

We shall develop this atteempt for the classication of the varieties of the Camellia, by their colors, after having described the modes of culture and multiplication.

(To be continued.)

AN ENUMERATION OF THE PRINCIPAL GENERA OF GREEN-HOUSE AND CONSERVATORY PLANTS; WITH THE SOIL EACH GENUS THRIVES IN.

INCLUDING THE MODE OF PROPAGATION, WHETHER FROM SEEDS, ROOTS, CUTTINGS, &c., &c.—BY C. M'INTOSH.

	Soil.	*Mode of Propagation.*
Acacia	Loam and peat	Cuttings and seeds, some species, however, from cuttings of the roots.
Acæna	Loam and peat	Cuttings root freely.
Achillea	Loam and peat	Cuttings root freely.
Achyranthes	Peat and loam	Cuttings, when the wood is young.
Acrostichum	Loam and peat or rotten wood	Dividing the roots, and by seed.
Actinocarpus	Loam and peat	Seeds, cultivated by being immersed in water.
Adenandria	Sandy loam or peat	Cuttings of the tips of the young wood, in fine sand, and cold frame.
Adiantum	Rotten wood, or sandy loam and peat	Dividing the root, or by seed, like *Acrostichum*.
Agapanthus	Loam and rotten dung	Dividing the roots, and sometimes from seeds.
Agathosma	Sandy peat	Cuttings of the young wood.
Agave	Rich loamy soil	Suckers from the roots.
Ageratum	Light rich soil	Cuttings root freely.
Aitonia	Sandy loam and peat	Cuttings of the young wood.
Aizoon	Loam and lime rubbish	Cuttings root freely.
Albuca	Rich light loam	By suckers from the old bulb.
Allantodia	Loam and peat	Dividing the root, or by seed.
Aloe	Light mould & lime rub.	Suckers which freely rise from the roots or stem.
Alonsoa	Light rich soil	Readily by cuttings and seeds.
Aloysia	Light rich soil	Cuttings of the young wood.
Alstræmeria	Very rich light mould	Seeds vegetate freely, if sown as soon as ripe, and by dividing the roots.
Alternanthera	Light rich soil	Readily increased by cuttings.
Amaryllis	Rich loam	By offsets from the bulbs.
Amellus	Loam and peat	Readily increased by cuttings.
Anabasis	Light loam	Cuttings of the young wood strike pretty freely.
Anacampseros	Sandy soil	By cuttings, or by leaves of the plant.
Anagallis	Light sandy soil	Cuttings of the plant strike readily during the spring and summer months.
Anagyris	Peat and loam	By cuttings.
Andersonia	Peat and loam	Cuttings of the young wood strike with care in March and April.
Andryala	Peat and loam	Cuttings root readily.
Anigozanthus	Peat and loam	By dividing at the root.
Anthericum	Sandy loam and peat	Generally from seed, or by cuttings.
Anthocercis	Loam and peat	Cuttings root freely.
Antholyza	Sandy loam	By seeds and offsets.
Anthospermum	Loam and peat	Cuttings strike freely.
Anthyllis	Loam and peat	Many of the species produce perfect seeds, which grow, and the others are propagated by cuttings.

	Soil.	*Mode of Propagation.*
Antirrhinum	Loam and peat	By cuttings.
Aotus	Peat and loam	Cuttings of the young shoots strike pretty freely.
Aponogeton	Loam and peat	By offsets from the bulbs, or by seeds; plant while growing should be placed in a pond or cistern of water, and should be kept dry all winter.
Araucaria	Peat and loam	By seeds, when they can be imported; sometimes by cuttings; but the latter method seldom produces good plants.
Arbutus	Rich sandy loam	By budding or inarching, on the common Arbutus; sometimes by seeds and layers.
Arctopus	Loam and peat	By seeds.
Arctotheca	Loam and peat	By cuttings freely.
Arctotis	Peat and loam	The herbaceous species are increased by dividing them at the root; the shrubby sorts by cuttings.
Ardisia	Loam and peat	By cuttings of the young wood, and when seeds are obtained, by that process.
Arduina	Peat and loam	Cuttings strike root but not readily.
Arenaria	Peat and loam	By seeds, and also by cuttings of the plant.
Arethusa	Rich loam and peat	By seeds, which should be sown as soon as ripe.
Aristea	Peat and loam	Readily propagated by dividing them at the root as well as by seeds.
Aristolochia	Loam and peat	Easily propagated by cuttings.
Artemisia	Loam and peat	Easily propagated by cuttings.
Arthropodium	Sandy loam and peat	Multiplied by seed, or by dividing at the root.
Asclepias	Sandy peat and loam	By seeds and cuttings.
Ascyrum	Peat and loam	Cuttings of the young wood strike freely.
Aspalathus	Loam and peat	By seed, and by cuttings of the young wood.
Asparagus	Loam and peat	Cuttings will root best in a cold frame.
Aspidium	Peat and veget. mould.	By seeds, and by dividing at the roots.
Asplenium	Peat and veget. mould.	By seeds and by dividing at the roots.
Aster	Peat and loam	By cuttings.
Astroloma	Sandy loam and peat	Cuttings of the young wood strike pretty freely.
Athansia	Peat and loam	By cuttings.
Atraphaxis	Loam and peat	By cuttings.
Atriplex	Loam and peat	By cuttings.
Atropa	Loam and peat	By cuttings.
Aulax	Sandy loam	Not increased readily but by seeds which are imported.
Azalia	Sandy peat	Cuttings of the young wood strike pretty well in a bottom-heat.
Babiana	Sandy loam and peat	Rapidly by offsets from the roots, or by seeds.

	Soil.	*Mode of Propagation.*
Baccharis	Peat and loam	Cuttings of the young wood strike freely.
Bæckia	Peat and loam	Freely by cuttings.
Balsamita	Peat and loam	By cuttings.
Banksia	Peat and loam	By cuttings, but the best plants are from seeds imported from New-Holland.
Bartholina	Sandy loam and peat.	Requires little water while in an inactive state.
Bauera	Peat and loam	Cuttings of the half-ripened wood strike freely.
Beaufortia	Peat and loam	By cuttings of the half-ripened wood.
Bejaria	Sandy peat	By cuttings of the young wood.
Berckheya	Peat and loam	Readily increased by cuttings.
Bignonia	Peat and loam	Cuttings of the young wood strike in heat; the old wood sirike by layers: the former is the best method.
Billardiera	Peat and loam	By seeds, and also by cuttings.
Blæria	Sandy peat	By cuttings of the young wood.
Blandfordia	Sandy loam and peat.	By seeds or suckers from the roots
Blechnum	Peat and veget. mould	By seeds, and dividing the roots.
Bletia	Loam and peat	By dividing at the roots.
Bœhmeria	Loam and peat	Cuttings root freely.
Borbonia	Peat and loam	Cuttings of the young wood strike readily, if carefully shaded.
Boronia	Sandy peat	By cuttings.
Bosea	Loam and peat,	Cuttings of the ripened wood strike pretty freely.
Bossiæa	Sandy peat	Cuttings of the half-ripened wood strike freely.
Bouvardia	Peat and loam	Readily by cuttings, and also by pieces of the roots.
Brabejum	Sandy loam and peat.	By ripened cuttings of the wood.
Brachylæna	Peat and loam	Cuttings of the ripened wood strike freely.
Brachysema	Sandy peat	By layers, and sometimes by cuttings.
Brunia	Peat and loam	Freely by cuttings.
Brunsvigia	Rich light loam	By offsets from the bulbs.
Bryonia	Sandy loam	Cuttings of the young wood strike root readily.
Bubon	Peat and loam	Cuttings, taken off at a joint where the shoot is a little hard, strike freely.
Buddlea	Peat and loam	By cuttings.
Bupthalmum	Peat and loam	Readily by cuttings.
Bupleurum	Peat and loam	By cuttings.
Bursaria	Peat and loam	By cuttings of the young wood.
Burtonia	Sandy loam and peat.	Cuttings of the young wood strike with care. It is altogether a delicate genus.
Bystropogon	Peat and loam	Readily by cuttings.
Cacalia	Poor sandy soil	By cuttings which should be kept dry till rooted.
Cactus	Poor sandy soil	By cuttings, which should be kept dry till rooted.
Cæsia	Loam and peat	By seeds or dividing, at the roots.
Calceolaria	Loam and peat	By seeds and by cuttings.

	Soil.	*Mode of Propagation.*
Calendula	Peat and loam	Readily by cuttings.
Caleya	Sandy loam and peat.	By seeds, and by dividing the roots.
Calla	Peat and loam	By offsets of the roots.
Callicoma	Peat and loam	Cuttings of the ripened wood strike freely.
Callistachys	Loam and peat	From seeds, which often ripen, and also from cuttings.
Callistemon	Peat and loam	Readily by seeds.
Calodendrum	Loam and peat	By cuttings of the ripened wood.
Calostema	Peat and loam	By seeds which are produced on large plants, and also by offset bulbs.
Calothamnus	Peat and loam	By cuttings, which root freely if kept from damp.
Calytrix	Sandy loam and peat.	By cuttings, but not very readily.
Camellia	Sandy loam and peat	By seeds, cuttings, and by grafting and inarching on stocks of their own species.
Camphorosma	Peat and loam	By cuttings.
Campylia	Sandy peat and loam	By cuttings taken off at a joint.
Canarina	Light sandy loam	By dividing the roots, or by cuttings of the stem.
Capraria	Loam and peat	By cuttings.
Carthamus	Loam and peat	By cuttings.
Cassia	Peat and loam	By seeds or cuttings.
Cassine	Peat and loam	Cuttings of the ripened wood strike freely.
Cassuarina	Peat and loam	By cuttings, and often by imported seed.
Ceanothus	Sandy loam and peat.	By cuttings.
Celastrus	Peat and loam	By cuttings.
Centaurea	Peat and loam	Cuttings strike freely.
Cestrum	Loam and peat	By cuttings.
Cheilanthus	Peat and vegt. mould.	By seeds, and by dividing the roots.
Cheiranthus	Peat and loam	Cuttings strike readily.
Chenolea	Peat and loam	By cuttings.
Chimonanthus	Peat and loam	By layers in spring; by cuttings of the young wood in summer; but in greater quantity from the seeds imported.
Chironia	Sandy peat	Cuttings root freely.
Chorizema	Peat and light loam	By cuttings, but much better from seeds.
Chrysanhemum	Peat and loom	Cuttings root freely, and some species by dividing the roots.
Chrysocoma	Peat and loam	By cuttings.
Cineraria	Loam and peat	By cuttings.
Cissus	Peat and loam	Strike by cuttings in bottom-heat.
Cistus	Peat and loam	Most of the species propagate freely by cuttings, and all of them from seeds, which ripen abundantly.
Citrus	Rich soil	By seeds, cuttings, inarching, & grafting.
Clerodendrum	Loam and peat	By cuttings.
Clethera	Loam and peat	By cuttings, and also by seeds, which ripen often.
Cliffortia	Peat and loam	By cuttings.
Cluytia	Peat and loam	Cuttings strike freely.

(To be continued.)

THE ORCHARD.

METHOD OF PRUNING AND TRAINING STANDARD APPLE TREES.

At the request of the Committee of the Whitehaven Horticultural Society, I now submit to your consideration an account of the method of pruning and training the standard apple trees in the Earl of Lonsdale's Gardens, at Whitehaven Castle, during the last seventeen years.

I have frequently been very much surprised, when travelling for the purpose of seeing the gardens of different noblemen and gentlemen, to find so little attention paid to standard apple and pear trees; two objects, when under proper and judicious management, the most ornamental and useful of any to be found in a garden.

The common practice of treating standard fruit trees, even by experienced gardeners, is to head them down the first year they are planted, because they think the roots have been injured in taking up, in such a manner that they cannot support the whole of last year's wood; after that the tree is left to grow at will, any further than when a branch, or limb, becomes too large and spreading as to interfere with another tree, or some walk or foot path, then an axe, a bill, or saw is taken, and the incumbering limb, or branch, amputated.

The practice of pruning which I am going briefly to explain, I have not seen practised by any person, except by Mr. Barnet, gardener at the Experimental Gardens, Edinburgh, about seven years ago. Upwards of seventeen years ago, when I came to the Castle Gardens, Whitehaven, under Mr. John Pennyfeather, I found some standard apple trees about two years planted, and Mr. P. put them under my management. This gave me an opportunity of following out the system of pruning first adopted by me in the Isle of Man, about twenty-five years ago, where I commenced upon a piece of ground (five acres) at Ballaquinney More, Kirk Marowne, as an orchard and nursery, all planted with standard apple and pear trees, at the distance of seven yards by five, with very little protection from any wind. It then appeared to me that the nearer the ground I kept my trees, after I had got them into a bearing state, the more likely I should be to obtain a crop: this idea induced me to form the system of pruning which I have followed ever since.

My season for pruning commences as soon as the fruit is taken off the trees, and continue to the middle of March; during that time I cut out all the ill placed shoots, such as incline to grow towards the centre, or into each other, and I leave untouched all those that stand in such a way that the tree will form a cup, or something like

a well blown tulip, all the branches standing perfectly clear of each other, so that they will bear as much fruit on the inside as on the outside, the sun and air getting to all parts of the tree alike. The great object, in this windy part of the kingdom, is to keep fruit trees as low as possible: this may be done by removing a limb when it is likely to get over tall, leaving a young shoot at a proper place to succeed it, and by taking out a fourth or fifth of the old wood every year; in this way your trees will always have the appearance of being under twenty years of age. Having finished winter pruning, the next thing to be done is the shortening of the last year's wood. This is an operation of great importance, so much depending upon the nature of the season, as to whether the eyes will form wood or fruit spurs; and even the most experienced will sometimes err.—To give a person a just idea how to shorten the last year's wood without some practical lessons, will be rather difficult, I shall, therefore, make choice of three trees of different modes of growth.

The first, a weakly growing tree, whose extreme shoots seldom or never exceed fifteen inches of growth in one season, such as the Manx Codlin, and Hawthorndean, two trees that agree very well with my method of pruning.

Second: Trees whose extreme young wood is from eighteen to twenty-two inches, as the Keswick Codlin, Greenup Pippin, &c.

Third: Trees of most luxuriant growth, making two feet and upwards, of young wood in one season, as the Tiffin Apple, Tankard, Leadington, &c.

The main object is to cut those trees of different growths, so that the whole of the branches will be furnished with fruit-bearing spurs from the stem of the tree, (which should not be more than three feet high,) to the top of the last year but one, of its growth; this is effected by topping or shortening the last year's wood to proper lengths. The first, or weakly growing trees, I shorten to eight or nine inches, that is leaving a little more than one half, or just as the eyes may be of strength. The second, of middle growth, I shorten to twelve or fourteen inches, that is, leaving about two-thirds, or as the wood may have a healthy, strong, and well filled eye. The third, and last, is a kind of tree very difficult to manage in warm droppy seasons, but at all risks I shorten to about sixteen or seventeen inches, that is, leaving about three-fourths. The object of this topping or shortening of the young wood is simply this, if the young wood be left at full length, which is commonly the case (if not shortened by the frost, and this frequently happens,) that portion, which I cut off, becomes the most fruitful part of the tree, and leaves the lower part of last year's wood naked and barren, the extreme buds breaking more freely gives full vent to the sap, so that the lower buds neither break into laterals nor fruit spurs; consequently there is of the three different growths of trees, one half, two-thirds or three-fourths of every succeeding year's wood unfruitful; the

tree gets up to a great height and only bears its fruit upon the outside and extremity of large naked limbs or branches, and it cannot be gathered by hand, but the tree must be shaken, which renders the fruit, although of the best quality, fit only for immediate use, or sending to market. According to my method of pruning, a tree may be kept at the height of from twelve to fifteen feet for twenty-one years in full bearing, and after that headed over it becomes a new tree again.

The next thing is, at what time the topping or shortening to be performed?

I alluded before to Mr. Barnet, of the Experimental Gardens, Edinburgh, as the only person I ever met with who had any idea of this system, and he topped or shortened all at the time of winter pruning; this is frequently attended with bad effects; in some seasons the young wood is not well ripened or matured, so that when the knife is applied to the place you wish the extreme eye to break from, it frequently happens that one eye dies from the severity of the weather, this leaves a dead horn, which is one year before it decays off, and is often the cause of canker. The season that I shorten last year's young wood is in April, and sometimes as late as May. I never shorten until the tree begins to grow, that is when the sap has begun to fill up the buds at the top of the tree; this is known by the buds becoming crimson, or of a rose colour, and a little swelled, always choosing to cut above a bud on the outside, placing the back of the knife towards the centre of the tree, and cutting upwards in a slanting direction about half an inch above the eye. The difference of trees with respect to the time of breaking their buds is a full fortnight, which gives plenty of time for one person to go through a large orchard. It will frequently happen that instead of only the extreme bud breaking into wood, three, or sometimes four will break; in this case, at next winter's pruning, I shorten all down to two eyes, unless there be a branch wanted to fill up a vacancy, I then choose one well placed, and shorten it at the same time as the extreme shoot, only a little shorter; my reason for this is, if this and the extreme shoot were stopped both of a length, the sap would flow more freely to the top of the tree, the buds would break there more regularly, and this second shoot would only break about two thirds or three-fourths of its length, and leave a portion at the lower end naked and unfruitful.

The above method of pruning is only applicable to apple trees. Pear trees I treat in quite a different way; but, as the treatment of the apple was only requested, I conclude with this imperfect sketch of it.

JAMES CLARK.

Whitehaven Castle Garden, Cumberland, Sept. 21, 1839.

[*Gardener's Gazette.*

GARDENER'S CALENDAR FOR JUNE.

VEGETABLE GARDEN.

THE month of June is usually dry and hot, very little therefore can be done in the Kitchen Garden beyond destroying weeds and taking care of the crops already sown. Opportunities should however be embraced, for sowing Cauliflower, Brocoli, and Cabbage seeds. These should be on small beds protected by a scaffolding, on which is laid bushes, mats, or any thing which will keep the sun off. They should also be well watered. Successional crops of Tomatoes, Okra, Cucumbers, Squashes, Melons, and Snap Beans, should also sown, and if the weather is favourable, Carrots and Beets.

Transplant out Celery, Cabbages and Leeks. The, Cauliflowers and Brocoli, which were sown last month, will require to be pricked out this, or they will grow to too great a size.

THE FLOWER GARDEN.

Propagate *Pinks* by pipings, *Carnations* by layers, and *Fuchsias*, *Roses* and Green house plants generally, by cuttings. Take up *Tulip* and *Hyacinth* bulbs if not done last month, and put them in bags or boxes, which place in a cool, airy situation.—Take up *Ranunculus*, and *Ammonies*, as soon as the stems wither. Stick *Chrysanthemums*, tie up *Dahlias* and give plenty of water. Turn out Green-House plants in a shady situation. Train climbing plants on trelisses or walls. Transplant *Annuals* for late flowering, and sow seeds of a few more.

ERRATA.

Mr. WILLIAM ELLIOTT requests us to make the following corrections in his Examination of Mr. EDMUND RHETT's Agricultural Address, as errors of the Press, in our March number:—At page 120, 11th line, for "ideality" read *identity* —line 31, for "diffuses" read *defines*—line 43, for "the" read *their* products.

The following was accidentally omitted in the last number.—ED. SO. AGR:—

In the February number of the Southern Agriculturist, the article on Meteorological Observations, contained the following Errata, viz:—On page 82d, for "Months of the year 1839," read 1840—84th page, 11th line for "on" read *in*—on 85th page, 29th line, instead of "Septenius" read *Septenniary*—86th page, 17th line, for "relieving" read *realizing*—on 41st line, for "twenty-one to thirty" read *twenty or thirty*—and on next line, for "thickly" read *thinly*—on 87th page, 14th line, instead of "underdrained" read *undrained*—and five lines further, for "was" read *were*.